NUMERICAL PERFORMANCE OF ABS CODES FOR SYSTEMS OF NONLINEAR EQUATIONS [1]

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1 Introduction

The nonlinear ABS algorithms solve a nonlinear system of algebraic equations $F(x) = 0$ where F is a function $F : R^n \to R^n$ in component form $f_1(x) = 0, f_2(x) = 0, .., f_n(x) = 0$, $x \in R^n$. The ABS algorithms can be viewed as a modification of the Newton method. Newon method constructs an iterative sequence of points x_i, $i = 1, 2, ...$ by the relation $x_{i+1} = x_i + t_i$, where t_i is the solution of the linear system $J(x_i)t_i = -F(x_i)$ or in component form $a_k^T(x_i)t_i = -f_k(x_i)$, $k = 1, .., n$, where $J(x_i)$ indicates the Jacobian matrix of F evaluated at x_i, while $a_k(x_i)$ denotes the k-th row of J evaluated at x_i. The set of linear equations $a_k^T(x_i)t_i = -f_k(x_i)$, $k = 1, .., n$ is solved by the ABS method for linear systems after modifying the definition of J and F. The motivation is based on the fact that at the k-th step the ABS algorithms generate the next approximation to the solution t_i using the k-th equation and the vector t_{i_k} which is a solution of the system formed by the first $k-1$ equations. Since the new approximate point $x_i + t_{i_k}$ is expected to be closer to the solution $x^\star$ of $F(x) = 0$, it can be used to evaluate the k-th row of J and the k-th component of F. The procedure is the following.

Assing an initial vector x_0, set $m = 1$.
$(\star)$ Set $y_1 = x_{m-1}$, $H_1 = I$, for $k = 1$ to n compute:
$p_k = H_k^T z_k$ where $z_k \in R^n$ is a parameter which gives the type of ABS method,
$\delta_k = p_k^T a_k(y_k)$, $\beta_k = f_k(y_k)/\delta_k$, $y_{k+1} = y_k - \beta_k p_k$, $H_{k+1} = H_k - H_k a_k(y_k) p_k^T/\delta_k$.
Let $x_m = y_{n+1}$. If the stopping criterion is satisfied, stop; otherwise increment the index m by 1 and return to $(\star)$.

2 Implemented ABS codes

The ABS codes that we have implemented based on the above algorithm use three choices of the available parameter z_k that define three well-known ABS methods for the linear case.
The first code, routine nl-huang1, and the second code, routine nl-huang2, use the Huang method defined by $z_k = a_k(y_k)$, and the modified Huang method defined by $z_k = H_k^T a_k(y_k)$ and $\delta_k = p_k^T p_k$.
In the routine nl-huang1 the matrix H_k is updated by formula $H_{k+1} = H_k - H_k a_k(y_k) p_k^T/\delta_k$. In one major iteration (consisting of a sequence of n minor iterates such that system $J(x)t_i = -F(x)$ is solved) the number of multiplications is $3/2n^3$ for the Huang algorithm,

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$5/2n^3$ for the modified Huang algorithm and symmetry of H_k is forced by computing only the elements on a triangular part of the matrix. The memory requirement is $n^2/2$.
In the routine nl-huang2 the vector p_k is computed by the equivalent formula $p_k = a_k(y_k) - P_{k-1}D_{k-1}^{-1}P_{k-1}^T a_k(y_k)$ in Huang method and $p_k = s_k - P_{k-1}D_{k-1}^{-1}P_{k-1}^T s_k$, $s_k = a_k(y_k) - P_{k-1}D_{k-1}^{-1}P_{k-1}^T a_k(y_k)$ in the modified Huang method, where $P_{k-1} = (p_1, .., p_{k-1})$, $D_{k-1} = (\delta_1, .., \delta_{k-1})$. In one major iteration the number of multiplications is n^3 for the Huang algorithm, $2n^3$ for the modified Huang algorithm, the memory is n^2. This code requires less operations but more memory than nl-huang1.
In the third code, routine nl-ilu, the parameter choices are the same of the implicit LU algorithm with column pivoting, that is $z_k = e_j$ where j is such that $|e_j^T H_k a_k(y_k)| = max\{|e_l^T H_k a_k(y_k)|, l = 1, .., n\}$. A major iteration requires $n^3/3$ multiplications and $n^2/2$ memory (memory requirement can be reduced to $n^2/4$ by using a different implementation).
In a major iteration the number of component function evaluations is n and the number of element jacobian evaluation is n^2 for all the codes.
The jacobian is singular if at least one row k is linearly dependent, in which case in all the algorithms the iteration continues setting $y_{k+1} = y_k$. In the theoretical ABS method the test for linearly dependence is $H_k a_k = 0$, in the present codes the test is done on the value of δ_k and the zero is substituted by a tolerance t or $t * \|a_k\|$ where t is given by the user.
The programs have four stopping criteria. The first criterion depends on a measure of the residual $\|F(x_i)\|_\infty \leq eps$, the second criterion is based on a measure of the relative distance between consecutive iterates $\|x_{i+1} - x_i\|_\infty \leq tol\|x_i\|_\infty$, the third criterion terminates the iterations if no progress occurs in decreasing the function after a fixed number n_s of steps. The last criterion terminates the iterations after a fixed number $itmax$ of steps. The parameters t, eps, tol, n_s, $itmax$ are given by the user.
Optionally, if the norm of F is increasing at an iteration i, the implemented algorithms can use a line search technique. Setting $\bar{x} = x_i$, the line search technique reduces the width of the interval between the points x_{i-1} and $\bar{x}$ by 1/2 (the new point is $\bar{x} = (x_{i-1} + \bar{x})/2$) and so on, until a point $\bar{x}$ is found where the norm of $F(\bar{x})$ decreases, or a maximum number n_{half} of halvings is achieved, where n_{half} is given by the user.
The codes are written in Fortran 77 in single and in double precision.

3 Numerical experiments

In this section, we present results of extended numerical experiments with 6 nonlinear ABS algorithms:

nl_huang1d – This double precision subroutine implements both the Huang and the modified Huang algorithms in the basic form. A subroutine which computes rows of the Jacobian matrix is required.

nl_huang2d – This double precision subroutine implements both the Huang and the modified Huang algorithms in the product form. A subroutine which computes rows of the Jacobian matrix is required.

nl_ilud – This double precision subroutine implements the implicit LU algorithm. A subroutine which computes rows of the Jacobian matrix is required.

nl_huang_d – This double precision subroutine implements discrete versions of the Huang and the modified Huang algorithms. Jacobian matrices are computed by numerical differentiation.

nl_ilud_d – This double precision subroutine implements a discrete version of the implicit LU algorithm. Jacobian matrices are computed by numerical differentiation.

nl_ilud_dt – This double precision subroutine implements a truncated version of the implicit LU algorithm. Jacobian matrices are computed by the numerical differentiation.

The ABS subroutines use several input data, namely the maximum number of iterations $itmax$, the maximum number of unsuccessful steps n_s, the maximum number of line-search steps n_l and tolerances t, h, eps, tol described above (h is a parameter for the numerical differentiation). We have preliminarly tested several choices of these parameters to select the best values. In this way, we have taken values $itmax = 500$, $n_s = 20$, $n_l = 10$ (versions without line searches were less efficient), $t = 10^{-16}$, $h = 10^{-6}$, $eps = 10^{-16}$, $tol = 10^{-8}$. In all preliminary tests, the modified Huang algorithm gave the same number of successfully solved problems as the Huang algorithm, but the computational time required was greater. Therefore, we deleted the modified Huang algorithm from all tests presented in the Appendix.
To compare the ABS codes with other codes for solving systems of nonlinear equations, we have selected several well-known subroutines which are broadly cited in the literature:

- Subroutines from the MINPACK library [25]. Subroutine `hybrj` is a trust region realization of the Newton method and it requires analytically computed elements of the Jacobian matrices. Subroutine `hybrd` is a trust region realization of the good Broyden method which does not use derivatives.
- Subroutine `soneq4` [26], which is a simple realization of the Newton method with analytically or numerically computed derivatives.
- Subroutine `tensolve` [27], which is a line search or trust region realization of the Newton method with possible tensor corrections.
- Subroutine `dafne` [28], which is based on methods for solving ordinary differential equations.
- Subroutine `brent` [29], which is a successful realization of the Brent method.
- Subroutines from the HARWELL library [30]. Subroutine `ns11ad` is a line search realization of the Powell derivative free method.
- Routines generated by the UFO system [19]. Routine UFO-Newton is a trust region realization of the Newton method and it requires analytically computed elements of the Jacobian matrices. Routine UFO-Broyden is a trust region realization of the good Broyden method which does not use derivatives.

All mentioned codes can be divided into two classes. The first class contains relatively simple algorithms, which are usually fast, but sometimes can fail being used for solving difficult problems. The ABS algorithms, `soneq4`, `brent` and `ns12ad` belong to the first

class. The second class contains algorithms based on complicated globalization strategies, which are robust but usually slower. The MINPACK subroutines, `tensolve`, `dafne` and the UFO routines belong to the second class.
All codes have been tested by using a collection of 64 problems with 100, 200 and 500 variables. Problems 1 – 32 of this collection are described in Section 5 (see also [18]) and they can be downloaded from the web page `http://www.cs.cas.cz/~luksan/test.html`. Problems 33 – 64 are taken from [23].
Detailed results of our numerical experiments are well-arranged in the set of tables given in the Appendix. Rows of these tables correspond to individual problems. Each row contains the numbers of iterations (it), function evaluations (nf), Jacobian evaluations (nj), the reached norm (F), the information concerning the termination (inf) and the required computational time. Several problems could not be solved because of overflows or divisions by zero (invalid operations). Problems, which led to invalid operations or required considerable computational time, were deleted from the largest tests (with $n = 500$). Subroutines, which required considerable computational time for more than two problems, were eliminated from the largest tests.
In the following tables, we give a summary of computational experiments. In these tables, it, nf, nj have the same meaning as in the Appendix, del is the number of deleted problems and suc is the number of succesfully solved problems (from 64 problems).Table 1 contains results corresponding to problems with 100 variables, Table 2 concerns problems with 200 variables and Table 3 is devoted to problems with 500 variables.

Algorithm	it	nf	nj	del	suc	time
nl_huang1d	1397	8366	1397	5	40	0:19
nl_huang2d	1677	10997	1677	5	40	0:19
nl_ilud	1198	8036	1198	7	39	0:07
nl_huangd_d	1695	183831	0	4	39	1:47
nl_ilud_d	1345	80661	0	4	39	0:46
nl_ilud_dt	1345	91575	0	4	39	0:48
hybrj	1468	2155	196	2	51	0:09
hybrd	1459	20720	0	3	48	0:16
soneq4/j	477	1165	481	5	51	0:02
soneq4/d	451	92165	2051	3	50	0:22
tensolve	1616	4797	1616	3	56	0:38
dafne	1817	2266	2012	1	59	1:06
brent	612	32923	0	4	42	0:18
ns11ad	39005	47522	0	1	54	2:22
UFO-Newton	1193	1317	1193	0	61	0:42
UFO-Broyden	1987	23955	0	0	62	0:22

Table 1 – results for 100 variables

Algorithm	it	nf	nj	del	suc	time
nl_huang1d	1648	9157	1648	5	40	2:58
nl_huang2d	1620	8817	1620	5	40	2:02
nl_ilud	1533	11821	1583	9	40	0:51
nl_huangd_d	1743	361732	0	4	40	14:04
nl_ilud_d	1591	175953	0	4	40	6:16
nl_ilud_dt	1591	206688	0	4	40	6:27
hybrj	1291	1875	184	1	54	0:42
hybrd	1268	34168	0	3	52	1:32
soneq4/j	542	1477	551	1	52	0:18
soneq4/d	523	213257	0	1	51	4:21
tensolve	1756	5088	1756	1	59	4:40
dafne	2037	2484	2232	1	57	10:30
brent	546	56203	0	4	38	2:13
ns11ad	64519	80519	0	1	50	16:54
UFO-Newton	1528	1677	1528	0	59	8:34
UFO-Broyden	2341	51576	0	0	60	2:55

Table 2 – results for 200 variables

Algorithm	it	nf	nj	del	suc	time
nl_huang1d	1277	9672	1277	6	38	35:32
nl_huang2d	1318	10276	1318	6	38	29:34
nl_ilud	1022	8101	1022	9	40	7:40
nl_ilud_d	1106	292323	0	6	39	50:53
nl_ilud_dt	1106	330220	0	6	39	52:07
hybrj	1317	1883	186	2	51	9:32
hybrd	1000	62127	0	5	42	12:00
soneq4/j	482	1304	492	1	49	5:17
brent	426	107877	0	4	38	32:62
UFO-Broyden	2060	114094	0	1	60	49:06

Table 3 – results for 500 variables

Notice that computational times given in the above tables do not express the computational efficiency of inidividual algorithms entirely, since many (usually the most dificult) problems were often deleted from the tests.
Results given in the above tables (and in the Appendix) imply several conclusions.

- Present implementations of the ABS algorithms can be considered as average methods for solving nonlinear equations. The nonlinear ILU algorithm is very fast, competitive with the best algorithms tested. Unfortunately, many problems were not solved because of invalid operations and unsuitable stepsizes. This is caused by the fact that function evaluations are performed at points which can be rather far from the best up-to-date estimation of the minimum. Nonlinear Huang algorithms are much slower than ILU and their precision is not substantially higher than the precision of the nonlinear ILU algorithm, especially for the large-scale problems.

- From the algorithms tested, the very simple subroutine `soneq4` (it contains 140 Fortran lines) is surprisingly the fastest and relatively successful. Subroutine `brent` is quite worst, even if it represents a relatively successful implementaton of the Brent algorithm. Subroutines `dafne`, `tensolve` and the UFO routines are very robust. They successfully solve almost all problems from the given collection (UFO-Broyden solves 62 problems from 64 for 100 variables), but are rather slow. This can be explained by the fact that they do not terminate computations even if the rate of convergence is very slow. Instead of the termination, they try to found the best strategy for a further progress.

- Problems with 500 variables lie on the frontier of reasonable computations. For such problems, the exploition of their structure is highly welcome. For example, 32 first problems from our collection have sparse Jacobian matrices and for $n = 2000$ were solved, by special UFO routines, after 17 seconds.

4 Test problems for large-scale systems of nonlinear equations

We seek a solution to the nonlinear system

$$f_k(x) = 0, \quad 1 \le k \le n$$

from the starting point $\bar{x}$. For positive integers k and l, we use the notation $\mathrm{div}(k,l)$ for integer division, i.e., maximum integer not greater than k/l, and $\mathrm{mod}(k,l)$ for the remainder after integer division, i.e., $\mathrm{mod}(k,l) = l(k/l - \mathrm{div}(k,l))$. The description of individual problems follows.

Problem 1. Countercurrent reactors problem 1 [7] (modified).

$$\begin{aligned}
f_k(x) &= \alpha - (1-\alpha)x_{k+2} - x_k(1+4x_{k+1}) && , \ k=1\\
f_k(x) &= -(2-\alpha)x_{k+2} - x_k(1+4x_{k-1}) && , \ k=2\\
f_k(x) &= \alpha x_{k-2} - (1-\alpha)x_{k+2} - x_k(1+4x_{k+1}) && , \ \mathrm{mod}\ (k,2)=1\ , \ 2<k<n-1\\
f_k(x) &= \alpha x_{k-2} - (2-\alpha)x_{k+2} - x_k(1+4x_{k-1}) && , \ \mathrm{mod}\ (k,2)=0\ , \ 2<k<n-1\\
f_k(x) &= \alpha x_{k-2} - x_k(1+4x_{k+1}) && , \ k=n-1\\
f_k(x) &= \alpha x_{k-2} - (2-\alpha) - x_k(1+4x_{k-1}) && , \ k=n\\
\alpha &= 1/2\\
\overline{x}_i &= 0.1 \quad , \ \mathrm{mod}\ (i,8)=1\\
\overline{x}_i &= 0.2 \quad , \ \mathrm{mod}\ (i,8)=2 \ \text{ or } \ \mathrm{mod}\ (i,8)=0\\
\overline{x}_i &= 0.3 \quad , \ \mathrm{mod}\ (i,8)=3 \ \text{ or } \ \mathrm{mod}\ (i,8)=7\\
\overline{x}_i &= 0.4 \quad , \ \mathrm{mod}\ (i,8)=4 \ \text{ or } \ \mathrm{mod}\ (i,8)=6\\
\overline{x}_i &= 0.5 \quad , \ \mathrm{mod}\ (i,8)=5
\end{aligned}$$

Problem 2. Countercurrent reactors problem 2 [7] (modified).

$$\begin{aligned}
f_k(x) &= x_1 - (1-x_1)x_{k+2} - \alpha(1+4x_{k+1}) && , \ k=1\\
f_k(x) &= -(1-x_1)x_{k+2} - \alpha(1+4x_k) && , \ k=2\\
f_k(x) &= \alpha x_1 - (1-x_1)x_{k+2} - x_k(1+4x_{k-1}) && , \ k=3
\end{aligned}$$

$$
\begin{aligned}
f_k(x) &= x_1 x_{k-2} + (1 - x_1) x_{k+2} - x_k(1 + 4x_{k-1}) &&, \ 3 < k < n-1 \\
f_k(x) &= x_1 x_{k-2} + x_k(1 + 4x_{k-1}) &&, \ k = n-1 \\
f_k(x) &= x_1 x_{k-2} - (1 - x_1) - x_k(1 + 4x_{k-1}) &&, \ k = n \\
\alpha &= 0.414214 \\
\overline{x}_i &= 0.1 \ , \ \mathrm{mod}\ (i,8) = 1, \quad & \overline{x}_i &= 0.2 \ , \ \mathrm{mod}\ (i,8) = 2 \\
\overline{x}_i &= 0.3 \ , \ \mathrm{mod}\ (i,8) = 3, \quad & \overline{x}_i &= 0.4 \ , \ \mathrm{mod}\ (i,8) = 4 \\
\overline{x}_i &= 0.5 \ , \ \mathrm{mod}\ (i,8) = 5, \quad & \overline{x}_i &= 0.4 \ , \ \mathrm{mod}\ (i,8) = 6 \\
\overline{x}_i &= 0.3 \ , \ \mathrm{mod}\ (i,8) = 7, \quad & \overline{x}_i &= 0.2 \ , \ \mathrm{mod}\ (i,8) = 0
\end{aligned}
$$

Problem 3. Trigonometric system [24].

$$
\begin{aligned}
f_k(x) &= 5 - (l+1)(1 - \cos x_k) - \sin x_k - \sum_{j=5l+1}^{5l+5} \cos x_j \\
l &= \mathrm{div}(k-1, 5) \\
\overline{x_i} &= 1/n, \quad i \geq 1
\end{aligned}
$$

Problem 4. Trigonometric - exponential system (trigexp 1) [24].

$$
\begin{aligned}
f_k(x) &= 3x_k^3 + 2x_{k+1} - 5 + \sin(x_k - x_{k+1}) \sin(x_k + x_{k+1}) \ , && k = 1 \\
f_k(x) &= 3x_k^3 + 2x_{k+1} - 5 + \sin(x_k - x_{k+1}) \sin(x_k + x_{k+1}) \\
&+ 4x_k - x_{k-1} \exp(x_{k-1} - x_k) - 3 &&, \quad 1 < k < n \\
f_k(x) &= 4x_k - x_{k-1} \exp(x_{k-1} - x_k) - 3 &&, \quad k = n \\
\overline{x}_i &= 0, \quad i \geq 1
\end{aligned}
$$

Problem 5. Trigonometric - exponential system (trigexp 2) [24].

$$
\begin{aligned}
f_k(x) &= 3(x_k - x_{k+2})^3 - 5 + 2x_{k+1} \\
&+ \sin(x_k - x_{k+1} - x_{k+2}) \sin(x_k + x_{k+1} - x_{k+2}) &&, \ \mathrm{mod}\ (k,2) = 1, \ k = 1 \\
f_k(x) &= -6(x_{k-2} - x_k)^3 + 10 - 4x_{k-1} \\
&- 2\sin(x_{k-2} - x_{k-1} - x_k) \sin(x_{k-2} + x_{k-1} - x_k) \\
&+ 3(x_k - x_{k+2})^3 - 5 + 2x_{k+1} \\
&+ \sin(x_k - x_{k+1} - x_{k+2}) \sin(x_k + x_{k+1} - x_{k+2}) &&, \ \mathrm{mod}\ (k,2) = 1, \ 1 < k < n \\
f_k(x) &= -6(x_{k-2} - x_k)^3 + 10 - 4x_{k-1} \\
&- 2\sin(x_{k-2} - x_{k-1} - x_k) \sin(x_{k-2} + x_{k-1} - x_k) &&, \ \mathrm{mod}\ (k,2) = 1, \ k = n \\
f_k(x) &= 4x_k - (x_{k-1} - x_{k+1}) \exp(x_{k-1} - x_k - x_{k+1}) - 3 &&, \ \mathrm{mod}\ (k,2) = 0 \\
\overline{x}_i &= 1, \quad i \geq 1
\end{aligned}
$$

Problem 6. Singular Broyden problem [10].

$$
\begin{aligned}
f_k(x) &= ((3 - 2x_k)x_k - 2x_{k+1} + 1)^2 &&, \ k = 1 \\
f_k(x) &= ((3 - 2x_k)x_k - x_{k-1} - 2x_{k+1} + 1)^2 &&, \ 1 < k < n \\
f_k(x) &= ((3 - 2x_k)x_k - x_{k-1} + 1)^2 &&, \ k = n \\
\overline{x}_i &= -1, \quad i \geq 1
\end{aligned}
$$

Problem 7. Tridiagonal system [15].

$$
\begin{aligned}
f_k(x) &= 4(x_k - x_{k+1}^2) && , \ k = 1 \\
f_k(x) &= 8x_k(x_k^2 - x_{k-1}) - 2(1 - x_k) + 4(x_k - x_{k+1}^2) && , \ 1 < k < n \\
f_k(x) &= 8x_k(x_k^2 - x_{k-1}) - 2(1 - x_k) && , \ k = n \\
\overline{x}_i &= 12, \quad i \geq 1
\end{aligned}
$$

Problem 8. Five-diagonal system [15].

$$
\begin{aligned}
f_k(x) &= 4(x_k - x_{k+1}^2) + x_{k+1} - x_{k+2}^2 && , \ k = 1 \\
f_k(x) &= 8x_k(x_k^2 - x_{k-1}) - 2(1 - x_k) \\
&+ 4(x_k - x_{k+1}^2) + x_{k+1} - x_{k+2}^2 && , \ k = 2 \\
f_k(x) &= 8x_k(x_k^2 - x_{k-1}) - 2(1 - x_k) \\
&+ 4(x_k - x_{k+1}^2) + x_{k-1}^2 - x_{k-2} + x_{k+1} - x_{k+2}^2 && , \ 2 < k < n-1 \\
f_k(x) &= 8x_k(x_k^2 - x_{k-1}) - 2(1 - x_k) \\
&+ 4(x_k - x_{k+1}^2) + x_{k-1}^2 - x_{k-2} && , \ k = n-1 \\
f_k(x) &= 8x_k(x_k^2 - x_{k-1}) - 2(1 - x_k) + x_{k-1}^2 - x_{k-2} && , \ k = n \\
\overline{x}_i &= -2, \quad i \geq 1
\end{aligned}
$$

Problem 9. Seven-diagonal system [15].

$$
\begin{aligned}
f_k(x) &= 4(x_k - x_{k+1}^2) + x_{k+1} - x_{k+2}^2 + x_{k+2} - x_{k+3}^2 && , \ k = 1 \\
f_k(x) &= 8x_k(x_k^2 - x_{k-1}) - 2(1 - x_k) \\
&+ 4(x_k - x_{k+1}^2) + x_{k-1}^2 + x_{k+1} - x_{k+2}^2 + x_{k+2} - x_{k+3}^2 && , \ k = 2 \\
f_k(x) &= 8x_k(x_k^2 - x_{k-1}) - 2(1 - x_k) \\
&+ 4(x_k - x_{k+1}^2) + x_{k-1}^2 - x_{k-2} + x_{k+1} - x_{k+2}^2 \\
&+ x_{k-2}^2 + x_{k+2} - x_{k+3}^2 && , \ k = 3 \\
f_k(x) &= 8x_k(x_k^2 - x_{k-1}) - 2(1 - x_k) \\
&+ 4(x_k - x_{k+1}^2) + x_{k-1}^2 - x_{k-2} + x_{k+1} - x_{k+2}^2 \\
&+ x_{k-2}^2 + x_{k+2} - x_{k-3} - x_{k+3}^2 && , \ 3 < k < n-2 \\
f_k(x) &= 8x_k(x_k^2 - x_{k-1}) - 2(1 - x_k) \\
&+ 4(x_k - x_{k+1}^2) + x_{k-1}^2 - x_{k-2} + x_{k+1} - x_{k+2}^2 \\
&+ x_{k-2}^2 + x_{k+2} - x_{k-3} && , \ k = n-2 \\
f_k(x) &= 8x_k(x_k^2 - x_{k-1}) - 2(1 - x_k) \\
&+ 4(x_k - x_{k+1}^2) + x_{k-1}^2 - x_{k-2} + x_{k+1} \\
&+ x_{k-2}^2 - x_{k-3} && , \ k = n-1 \\
f_k(x) &= 8x_k(x_k^2 - x_{k-1}) - 2(1 - x_k) + x_{k-1}^2 - x_{k-2} \\
&+ x_{k-2}^2 - x_{k-3} && , \ k = n \\
\overline{x}_i &= -3, \quad i \geq 1
\end{aligned}
$$

Problem 10. Structured Jacobian problem [10].

$$
\begin{aligned}
f_k(x) &= -2x_k^2 + 3x_k - 2x_{k+1} + 3x_{n-4} - x_{n-3} \\
&- x_{n-2} + 0.5x_{n-1} - x_n + 1 && , \ k = 1
\end{aligned}
$$

$$
\begin{aligned}
f_k(x) &= -2x_k^2 + 3x_k - x_{k-1} - 2x_{k+1} + 3x_{n-4} - x_{n-3} \\
&- \; x_{n-2} + 0.5x_{n-1} - x_n + 1 \qquad , \; 1 < k < n \\
f_k(x) &= -2x_k^2 + 3x_k - x_{k-1} + 3x_{n-4} - x_{n-3} \\
&- \; x_{n-2} + 0.5x_{n-1} - x_n + 1 \qquad , \; k = n \\
\overline{x}_i &= -1, \quad i \geq 1
\end{aligned}
$$

Problem 11. Extended Freudenstein and Roth function [5].

$$
\begin{aligned}
f_k &= x_k + ((5 - x_{k+1})x_{k+1} - 2)x_{k+1} - 13 \;, \quad \mathrm{mod}(k,2) = 1 \\
f_k &= x_{k-1} + ((x_k + 1)x_k - 14)x_k - 29 \quad , \quad \mathrm{mod}(k,2) = 0 \\
\overline{x}_i &= 90 \;, \quad \mathrm{mod}(i,2) = 1, \qquad \overline{x}_i \;=\; 60 \;, \quad \mathrm{mod}(i,2) = 0
\end{aligned}
$$

Problem 12. Extended Powell singular problem [21].

$$
\begin{aligned}
f_k(x) &= x_k + 10x_{k+1} \qquad , \quad \mathrm{mod}(k,4) = 1 \\
f_k(x) &= \sqrt{5}(x_{k+1} - x_{k+2}) \quad , \quad \mathrm{mod}(k,4) = 2 \\
f_k(x) &= (x_{k-1} - 2x_k)^2 \qquad , \quad \mathrm{mod}(k,4) = 3 \\
f_k(x) &= \sqrt{10}(x_{k-3} - x_k)^2 \quad , \quad \mathrm{mod}(k,4) = 0 \\
\overline{x}_i &= 3 \;, \quad \mathrm{mod}(i,4) = 1, \qquad \overline{x}_i \;=\; -1 \;, \quad \mathrm{mod}(i,4) = 2 \\
\overline{x}_i &= 0 \;, \quad \mathrm{mod}(i,4) = 3, \qquad \overline{x}_i \;=\; 1 \;, \quad \mathrm{mod}(i,4) = 0
\end{aligned}
$$

Problem 13. Extended Cragg and Levy problem [21].

$$
\begin{aligned}
f_k(x) &= (\exp(x_k) - x_{k+1})^2 \quad , \quad \mathrm{mod}(k,4) = 1 \\
f_k(x) &= 10(x_k - x_{k+1})^3 \qquad , \quad \mathrm{mod}(k,4) = 2 \\
f_k(x) &= \tan^2(x_k - x_{k+1}) \qquad , \quad \mathrm{mod}(k,4) = 3 \\
f_k(x) &= x_k - 1 \qquad\qquad , \quad \mathrm{mod}(k,4) = 0 \\
\overline{x}_i &= 1 \;, \quad \mathrm{mod}(i,4) = 1, \qquad \overline{x}_i \;=\; 2 \;, \quad \mathrm{mod}(i,4) \neq 1
\end{aligned}
$$

Problem 14. Broyden tridiagonal problem [21].

$$
\begin{aligned}
f_k(x) &= x_k(0.5x_k - 3) + 2x_{k+1} - 1 \qquad , \; k = 1 \\
f_k(x) &= x_k(0.5x_k - 3) + x_{k-1} + 2x_{k+1} - 1 \;, \; 1 < k < n \\
f_k(x) &= x_k(0.5x_k - 3) - 1 + x_{k-1} \qquad , \; k = n \\
\overline{x}_i &= -1, \quad i \geq 1
\end{aligned}
$$

Problem 15. Generalized Broyden banded problem [21].

$$
\begin{aligned}
f_k(x) &= (2 + 5x_k^2)x_k + 1 + \sum_{i=k_1}^{k_2} x_i(1 + x_i) \\
k_1 &= \max\,(1, k-5), \qquad k_2 = \min\,(n, k+1) \\
\overline{x}_i &= -1, \quad i \geq 1
\end{aligned}
$$

Problem 16. Extended Powell badly scaled function [21].

$$
\begin{aligned}
f_k(x) &= 10000\, x_k\, x_{k+1} - 1 &&, \quad \mathrm{mod}(k,2) = 1\\
f_k(x) &= \exp(-x_{k-1}) + \exp(-x_k) - 1.0001 &&, \quad \mathrm{mod}(k,2) = 2\\
\overline{x}_i &= 0 \ , \quad \mathrm{mod}(i,2) = 1, \qquad \overline{x}_i = 1 &&, \quad \mathrm{mod}(i,2) = 0
\end{aligned}
$$

Problem 17. Extended Wood problem [12].

$$
\begin{aligned}
f_k(x) &= -200x_k(x_{k+1} - x_k^2) - (1 - x_k) &&, \quad \mathrm{mod}(k,4) = 1\\
f_k(x) &= 200(x_k - x_{k-1}^2) + 20(x_k - 1) + 19.8(x_{k+2} - 1) &&, \quad \mathrm{mod}(k,4) = 2\\
f_k(x) &= -180x_k(x_{k+1} - x_k^2) - (1 - x_k) &&, \quad \mathrm{mod}(k,4) = 3\\
f_k(x) &= 180(x_k - x_{k-1}^2) + 20.2(x_k - 1) + 19.8(x_{k-2} - 1) &&, \quad \mathrm{mod}(k,4) = 4\\
\overline{x}_i &= -3, \quad \mathrm{mod}(i,2) = 1, \quad \overline{x}_i = -1, \quad \mathrm{mod}(i,2) = 0
\end{aligned}
$$

Problem 18. Tridiagonal exponential problem [5].

$$
\begin{aligned}
f_k(x) &= x_k - \exp(\cos(h(x_k + x_{k+1}))) &&, \ k = 1\\
f_k(x) &= x_k - \exp(\cos(h(x_{k-1} + x_k + x_{k+1}))) &&, \ 1 < k < n\\
f_k(x) &= x_k - \exp(\cos(h(x_{k-1} + x_k))) &&, \ k = n\\
h &= 1/(n+1)\\
\overline{x}_i &= 1.5, \quad i \geq 1
\end{aligned}
$$

Problem 19. Discrete boundary value problem [21].

$$
\begin{aligned}
f_k(x) &= 2x_k + 0.5h^2(x_k + hk)^3 - x_{k+1} &&, \ k = 1\\
f_k(x) &= 2x_k + 0.5h^2(x_k + hk)^3 - x_{k-1} - x_{k+1} &&, \ 1 < k < n\\
f_k(x) &= 2x_k + 0.5h^2(x_k + hk)^3 - x_{k-1} &&, \ k = n\\
h &= 1/(n+1)\\
\overline{x}_i &= ih(ih - 1), \quad i \geq 1
\end{aligned}
$$

Problem 20. Brent problem [4].

$$
\begin{aligned}
f_k(x) &= 3x_k(x_{k+1} - 2x_k) + x_{k+1}^2/4 &&, \ k = 1\\
f_k(x) &= 3x_k(x_{k+1} - 2x_k + x_{k-1}) + (x_{k+1} - x_{k-1})^2/4 &&, \ 1 < k < n\\
f_k(x) &= 3x_k(20 - 2x_k + x_{k-1}) + (20 - x_{k-1})^2/4 &&, \ k = n\\
\overline{x}_i &= 10, \quad i \geq 1
\end{aligned}
$$

Problem 21. Troesch problem [22].

$$
\begin{aligned}
f_k(x) &= 2x_k + \rho h^2 \mathrm{sing}(\rho x_k) - x_{k+1} &&, \ k = 1\\
f_k(x) &= 2x_k + \rho h^2 \sinh(\rho x_k) - x_{k-1} - x_{k+1} &&, \ 1 < k < n\\
f_k(x) &= 2x_k + \rho h^2 \sinh(\rho x_k) - x_{k-1} - 1 &&, \ k = n\\
\rho &= 10, \quad h = 1/(n+1)\\
\overline{x}_i &= 1, \quad i \geq 1
\end{aligned}
$$

Problem 22. Flow in a channel [1].

This is a finite difference analogue of the following nonlinear ordinary differential equation

$$u'''' = R(u'u'' - uu'''), \quad R = 500$$

over unit interval Ω with boundary conditions $u(0) = 0$, $u'(0) = 0$, $u(1) = 1$, $u'(1) = 0$. We use standard 5-point finite differences on an uniform grid having 5000 internal nodes. The initial approximate solution is a discretization of $u_0(x) = (x - 1/2)^2$.

Problem 23. Swirling flow [1].

This is a finite difference analogue of the following system of two nonlinear ordinary differential equations

$$\begin{aligned} u'''' + R(uu''' + vv') &= 0 \\ v'' + R(uv' + u'v) &= 0, \quad R = 500 \end{aligned}$$

over unit interval Ω with boundary conditions $u(0) = u'(0) = u(1) = u'(1) = 0$, $v(0) = -1$, $v(1) = 1$. We use standard 5-point finite differences on an uniform grid having 2500 internal nodes. The initial approximate solution is a discretization of $u_0(x) = (x - 1/2)^2$ and $v_0(x) = x - 1/2$.

Problem 24. Bratu problem [13].

This is a finite difference analogue of the following nonlinear partial differential equation

$$\Delta u + R\exp(u) = 0, \quad R = 6.8$$

over unit square Ω with Dirichlet boundary conditions $u = 0$ on $\partial\Omega$. We use standard 5-point finite differences on a uniform grid having 70×70 internal nodes. The initial approximate solution is a discretization of $u_0(x, y) = 0$.

Problem 25. Poisson problem 1 [10].

This is a finite difference analogue of the following nonlinear partial differential equation

$$\Delta u = \frac{u^3}{1 + x^2 + y^2}$$

over unit square Ω with Dirichlet boundary conditions $u(0, y) = 1$, $u(1, y) = 2 - \exp(y)$, $u(x, 0) = 1$, $u(x, 1) = 2 - \exp(x)$. We use standard 5-point finite differences on a uniform grid having 70×70 internal nodes. The initial approximate solution is a discretization of $u_0(x, y) = -1$.

Problem 26. Poisson problem 2 [20].

This is a finite difference analogue of the following nonlinear partial differential equation

$$\Delta u + \sin(2\pi u) + \sin\left(2\pi \frac{\partial u}{\partial x}\right) + \sin\left(2\pi \frac{\partial u}{\partial y}\right) + f(x, y) = 0,$$

where $f(x, y) = 1000((x - 1/4)^2 + (y - 3/4)^2)$, over unit square Ω with Dirichlet boundary conditions $u = 0$ on $\partial\Omega$. We use standard 5-point finite differences on a uniform grid having 70×70 internal nodes. The initial approximate solution is a discretization of $u_0(x, y) = 0$.

Problem 27. Porous medium problem [9].

This is a finite difference analogue of the following nonlinear partial differential equation

$$\Delta u^2 + R\left(\frac{\partial u^3}{\partial x} + f(x,y),\right) = 0, \quad R = 50,$$

where $f(1/71, 1/71) = 1$ and $f(x,y) = 0$ for $(x,y) \neq (1/71, 1/71)$, over unit square Ω with Dirichlet boundary conditions $u(0,y) = 1$, $u(1,y) = 0$, $u(x,0) = 1$, $u(x,1) = 0$. We use standard 5-point finite differences on a uniform grid having 70×70 internal nodes. The initial approximate solution is a discretization of $u_0(x,y) = 1 - xy$.

Problem 28. Convection-difussion problem [14].

This is a finite difference analogue of the following nonlinear partial differential equation

$$\Delta u - Ru\left(\frac{\partial u}{\partial x} + \frac{\partial u}{\partial y}\right) + f(x,y) = 0, \quad R = 20,$$

where $f(x,y) = 2000x(1-x)y(1-y)$, over unit square Ω with Dirichlet boundary conditions $u = 0$ on $\partial\Omega$. We use standard 5-point finite differences on a uniform grid having 70×70 internal nodes. The initial approximate solution is a discretization of $u_0(x,y) = 0$.

Problem 29. Nonlinear biharmonic problem [16].

This is a finite difference analogue of the following nonlinear partial differential equation

$$\Delta\Delta u + R\left(\max(0,u) + \text{sign}(x - \frac{1}{2})\right) = 0, \quad R = 500$$

over unit square Ω with the boundary conditions $u = 0$ on $\partial\Omega$ and $\partial u(0,y)/\partial x = 0$, $\partial u(1,y)/\partial x = 0$, $\partial u(x,0)/\partial y = 0$, $\partial u(x,1)/\partial y = 0$. We use standard 13-point finite differences on a shifted uniform grid having 50×50 internal nodes [13]. The initial approximate solution is a discretization of $u_0(x,y) = 0$.

Problem 30. Driven cavity problem [13].

This is a finite difference analogue of the following nonlinear partial differential equation

$$\Delta\Delta u + R\left(\frac{\partial u}{\partial y}\frac{\partial \Delta u}{\partial x} - \frac{\partial u}{\partial x}\frac{\partial \Delta u}{\partial y}\right) = 0, \quad R = 500$$

over unit square Ω with the boundary conditions $u = 0$ on $\partial\Omega$ and $\partial u(0,y)/\partial x = 0$, $\partial u(1,y)/\partial x = 0$, $\partial u(x,0)/\partial y = 0$, $\partial u(x,1)/\partial y = 1$. We use standard 13-point finite differences on a shifted uniform grid having 50×50 internal nodes [13]. The initial approximate solution is a discretization of $u_0(x,y) = 0$.

Problem 31.

$$\begin{aligned}
f_k(x) &= 2x_k + h^2(x_k^3 + 2\cdot 10^{-4}(2\cdot 10^{-4}(hk - 1/2)^2 - 1)x_k \\
&- 10^9 \exp(-3\cdot 10^4(hk - 1/2)^2)) - x_{k+1} \qquad , \ k = 1 \\
f_k(x) &= 2x_k + h^2(x_k^3 + 2\cdot 10^{-4}(2\cdot 10^{-4}(hk - 1/2)^2 - 1)x_k \\
&- 10^9 \exp(-3\cdot 10^4(hk - 1/2)^2)) - x_{k-1} - x_{k+1} \ , \ 1 < k < n \\
f_k(x) &= 2x_k + h^2(x_k^3 + 2\cdot 10^{-4}(2\cdot 10^{-4}(hk - 1/2)^2 - 1)x_k \\
&- 10^9 \exp(-3\cdot 10^4(hk - 1/2)^2)) - x_{k-1} \qquad , \ k = n \\
h &= 1/(n+1) \\
\overline{x}_i &= 5\min(ih, 1 - ih), \quad i \geq 1
\end{aligned}$$

Problem 32. Discrete boundary value problem [21].

$$\begin{aligned}
f_k(x) &= 2x_k + h^2(x_k^3 \exp(x_k) \\
&+ 5 \cdot 10^8 \exp(-10^4(hk-1/2)^2)\sqrt{|hk-1/2|}x_{k+1} \\
&+ 10^6 sign(hk-1/2)) - x_{k+1} \qquad , \ k=1 \\
f_k(x) &= 2x_k + h^2(x_k^3 \exp(x_k) \\
&+ 5 \cdot 10^8 \exp(-10^4(hk-1/2)^2)\sqrt{|hk-1/2|}(x_{k+1} - x_{k+1}) \\
&+ 10^6 sign(hk-1/2)) - x_{k-1} - x_{k+1} \quad , \ 1 < k < n \\
f_k(x) &= 2x_k + h^2(x_k^3 \exp(x_k) \\
&- 5 \cdot 10^8 \exp(-10^4(hk-1/2)^2)\sqrt{|hk-1/2|}x_{k-1}) \\
&+ 10^6 sign(hk-1/2)) - x_{k-1} \qquad , \ k=n \\
h &= 1/(n+1) \\
\overline{x}_i &= 5\min(ih, 1-ih), \quad i \geq 1
\end{aligned}$$

References

[1] Averick, B.M., and Carter, R.G., and Moré, J.J., *The Minpack-2 Test Problem Collection,* Research Report No. ANL/MCS-TM-150, Mathematics and Computer Science Division, Argonne National Laboratory, Argonne 1991.

[2] Abaffy, J., Broyden, C.G., and Spedicato, E., *A class of direct methods for linear systems.* Numerische Mathematik 45 (1984) pp. 361-376.

[3] Abaffy, J., and Spedicato, E., *ABS Projection Algorithms, Mathematical Techniques for solving Linear and Nonlinear Equations.* Ellis Horwood, Chichester 1989.

[4] Alefeld, G., and Gienger, A., and Potra, F., *Efficient Validation of Solutions of Nonlinear Systems,* SIAM Journal on Numerical Analysis, Vol 31, pp. 252-260, 1994.

[5] Bing, Y., and Lin, G., *An Efficient Implementation of Merrill's Method for Sparse or Partially Separable Systems of Nonlinear Equations,* SIAM Journal on Optimization, Vol. 2, pp. 206-221, 1991.

[6] Bodon, E., *ABS codes for nonlinear Huang, modified Huang and implicit LX algorithms for nonlinear systems of equations. Rept. No. DMSIA 00/xx, University of Bergamo, 2000*

[7] Bogle, I.D.L., and Perkins, J.D., A New Sparsity Preserving Quasi-Newton Update for Solving Nonlinear Equations, SIAM Journal on Scientific and Statistical Computations, Vol. 11, pp. 621-630, 1990.

[8] Deng, N., Spedicato, E., Zhu, M., *A local convergence theorem for nonlinear ABS algorithms,* Comp. Appl. Math., Vol. 13. No. 1, pp. 49-59, 1994.

[9] Eisenstat, S.C., and Walker, H.F., *Choosing the Forcing Terms in an Inexact Newton Method,* SIAM Journal on Scientific Computation, Vol. 17, pp. 16-32, 1996.

[10] Gomez-Ruggiero, M.A., and Martinez, J.M., and Moretti, A.C., *Comparing Algorithms for Solving Sparse Nonlinear Systems of Equations,* SIAM Journal on Scientific and Statistical Computations, Vol. 13, pp. 459-483, 1992.

[11] Huang, H.Y., *A direct method for the general solution of a system of linear equations.* JOTA Vol.16, pp.429-445, 1975.

[12] Incerti, S., and Zirilli, F., and Parisi, V., *Algorithm 111. A Fortran Subroutine for Solving Systems of Nonlinear Simultaneous Equations,* Computer Journal, Vol 24, pp. 87-91, 1981.

[13] Kaporin, I.E., and Axelsson, O., *On a Class of Nonlinear Equation Solvers Based on the Residual Norm Reduction Over a Sequence of Affine Subspaces,* SIAM Journal on Scientific and Statistical Computations, Vol 16, pp. 228-249, 1995.

[14] Kelley, C.T., *Iterative Methods for Linear and Nonlinear Equations,* SIAM, Philadelphia, Pennsylvania, 1995.

[15] Li, G., *Successive Column Correction Algorithms for Solving Sparse Nonlinear Systems of Equations,* Mathematical Programming, Vol. 43, pp. 187-207, 1989.

[16] Lukšan, L., Vlčček, J., *Computational Experience with Globally Convergent Descent Methods for Large Sparse Systems of Nonlinear Equations,* Optimization Methods and Software, Vol. 8, pp. 201-223, 1998.

[17] Lukšan, L., Vlčček, J., *Indefinitely Preconditioned Inexact Newton Method for Large Sparse Equality Constrained Nonlinear Programming Problems,* Numerical Linear Algebra with Applications, Vol. 5, pp. 219-247, 1998.

[18] Lukšan, L., Vlček, J., *Sparse and partially separable test problems for unconstrained and equality constrained optimization. Report No. 767, Institute of Computer Science, Academy of Sciences of the Czech Republic, Prague 1999.*

[19] Lukšan, L., Šiška, M., Tůůma, M., Vlčček, J., and Rame1vsováá, N., Interactive System for Universal Functional Optimization (UFO), Version 1998, Research Report No. V-766, Institute of Computer Science, Academy of Sciences of the Czech Republic, Prague, Czech Republic, 1999.

[20] Martinez, J.M., *A Quasi-Newton Method with Modification of One Column per Iteration,* Computing, Vol. 33, pp. 353-362, 1984.

[21] Moréé, J.J., Garbow, B.S., and Hillström, K.E., *Testing Unconstrained Optimization Software,* ACM Transactions on Mathematical Software, Vol. 7, pp. 17-41, 1981.

[22] Roberts, S.M., and Shipman, J.S., *On the Closed Form Solution of Troesch's Problem,* Journal of Computational Physics, Vol. 21, pp. 291-304, 1976.

[23] Roose, A., Kulla, V., Lomp, M., and Meressco, T., *Test examples of systems of nonlinear equations,* Estonian Software and Computer Service Company, Tallin, 1990.

[24] Toint, P.L., *Numerical Solution of Large Sets of Algebraic Equations,* Mathematics of Computation, Vol. 46, pp. 175-189, 1986.

[25] Garbow, B.S., Hillstrom, K.E., and Moré, *Argonne National Laboratory, MINPACK project,* March 1980.

[26] Tady nevim co.

[27] Bouaricha, A., Schnabel, R.B., *Algorithm 768,* Transactions on Mathematical Software, Vol. 232, pp. 174-195, 1997.

[28] *Algorithm 617,* Transactions on Mathematical Software, Vol. 10, pp. 317-324, 1984.

[29] *Algorithm 554,* Transactions on Mathematical Software, Vol.

[30] The Harwell subroutine library.

5 Appendix

In the following pages, we give detailed results of numerical experiments. Rows of these pages correspond to individual problems. Each row contains the numbers of iterations (it), function evaluations (nf), Jacobian evaluations (nj), the reached norm (F), the information concerning the termination (inf) and the required computational time. The total values are given in the last row. Summary of the results can be found in tables 1 – 3 in Section 4.

```
Test for subroutine nl_huang1d:    100  variables
-----------------------------------------------------------------------------
   1  it =    29  nf =     310  nj =    29  F = 0.4D+00  inf= 1000  time= 0:00
   2  it =     6  nf =       7  nj =     6  F = 0.8D-12  inf=    1  time= 0:00
   3  it =     3  nf =       4  nj =     3  F = 0.4D-09  inf=    1  time= 0:00
   4  it =    17  nf =     139  nj =    17  F = 0.3D-09  inf=    1  time= 0:00
   5          failed due to invalid operation
   6  it =    23  nf =      24  nj =    23  F = 0.4D-08  inf=    1  time= 0:01
   7  it =    21  nf =     227  nj =    21  F = 0.1D+05  inf= 1000  time= 0:00
   8  it =    24  nf =     234  nj =    24  F = 0.4D+02  inf= 1000  time= 0:00
   9  it =    47  nf =     358  nj =    47  F = 0.3D+01  inf= 1000  time= 0:01
  10  it =     6  nf =       7  nj =     6  F = 0.2D-08  inf=    1  time= 0:00
  11  it =    11  nf =      12  nj =    11  F = 0.2D-11  inf=    1  time= 0:00
  12  it =    18  nf =      19  nj =    18  F = 0.3D-08  inf=    1  time= 0:00
  13  it =    22  nf =      23  nj =    22  F = 0.6D-08  inf=    1  time= 0:00
  14  it =    22  nf =     232  nj =    22  F = 0.1D+01  inf= 1000  time= 0:01
  15  it =     5  nf =       6  nj =     5  F = 0.6D-09  inf=    1  time= 0:00
  16  it =    54  nf =     220  nj =    54  F = 0.8D-10  inf=    1  time= 0:00
  17  it =    83  nf =     731  nj =    83  F = 0.4D+00  inf= 1000  time= 0:01
  18  it =    69  nf =     707  nj =    69  F = 0.1D+01  inf= 1000  time= 0:01
  19  it =     2  nf =       3  nj =     2  F = 0.3D-08  inf=    1  time= 0:00
  20  it =    29  nf =     264  nj =    29  F = 0.1D+02  inf= 1000  time= 0:00
  21  it =    17  nf =      18  nj =    17  F = 0.9D-08  inf=    1  time= 0:01
  22  it =    38  nf =     419  nj =    38  F = 0.5D+01  inf= 1000  time= 0:00
  23  it =    27  nf =     295  nj =    27  F = 0.1D+01  inf= 1000  time= 0:01
  24  it =    51  nf =     475  nj =    51  F = 0.3D-03  inf= 1000  time= 0:00
  25  it =     4  nf =       5  nj =     4  F = 0.8D-11  inf=    1  time= 0:00
  26  it =     8  nf =       9  nj =     8  F = 0.9D-12  inf=    1  time= 0:00
  27  it =    19  nf =      20  nj =    19  F = 0.2D-12  inf=    1  time= 0:01
  28  it =    20  nf =     221  nj =    20  F = 0.1D+01  inf= 1000  time= 0:00
  29  it =    16  nf =      17  nj =    16  F = 0.4D-08  inf=    1  time= 0:00
  30  it =    27  nf =     278  nj =    27  F = 0.3D+00  inf= 1000  time= 0:01
  31  it =    20  nf =     221  nj =    20  F = 0.5D+05  inf= 1000  time= 0:00
  32          failed due to invalid operation
  33  it =   321  nf =     323  nj =   321  F = 0.1D-07  inf=    1  time= 0:04
  34  it =     4  nf =       5  nj =     4  F = 0.2D-08  inf=    1  time= 0:00
  35  it =     3  nf =       4  nj =     3  F = 0.5D-09  inf=    1  time= 0:00
  36  it =     1  nf =       2  nj =     1  F = 0.2D-15  inf=    1  time= 0:00
  37  it =     4  nf =       5  nj =     4  F = 0.6D-11  inf=    1  time= 0:00
  38  it =     2  nf =       3  nj =     2  F = 0.8D-10  inf=    1  time= 0:00
  39  it =    32  nf =     340  nj =    32  F = 0.1D+01  inf= 1000  time= 0:00
  40  it =     4  nf =       5  nj =     4  F = 0.7D-11  inf=    1  time= 0:00
  41          failed due to invalid operation
  42  it =     1  nf =       2  nj =     1  F = 0.0D+00  inf=    1  time= 0:00
  43  it =     3  nf =       4  nj =     3  F = 0.9D-12  inf=    1  time= 0:01
  44  it =     5  nf =       6  nj =     5  F = 0.7D-08  inf=    1  time= 0:00
  45  it =     3  nf =       4  nj =     3  F = 0.1D-15  inf=    1  time= 0:00
  46  it =    23  nf =     238  nj =    23  F = 0.3D-02  inf= 1000  time= 0:01
  47  it =   126  nf =    1220  nj =   126  F = 0.4D+07  inf= 1000  time= 0:02
  48  it =     5  nf =       6  nj =     5  F = 0.2D-14  inf=    1  time= 0:00
  49  it =     3  nf =       4  nj =     3  F = 0.1D-09  inf=    1  time= 0:00
  50  it =     3  nf =       4  nj =     3  F = 0.2D-13  inf=    1  time= 0:00
  51  it =    17  nf =      18  nj =    17  F = 0.9D-08  inf=    1  time= 0:01
  52  it =     4  nf =       5  nj =     4  F = 0.2D-09  inf=    1  time= 0:00
  53  it =     4  nf =       5  nj =     4  F = 0.2D-14  inf=    1  time= 0:00
  54  it =    23  nf =     230  nj =    23  F = 0.5D+01  inf= 1000  time= 0:00
  55  it =     2  nf =       3  nj =     2  F = 0.5D-08  inf=    1  time= 0:00
  56  it =     4  nf =       5  nj =     4  F = 0.4D-13  inf=    1  time= 0:00
  57  it =     6  nf =       7  nj =     6  F = 0.2D-13  inf=    1  time= 0:00
  58          failed due to invalid operation
  59  it =     4  nf =       5  nj =     4  F = 0.4D-10  inf=    1  time= 0:00
  60  it =    34  nf =     357  nj =    34  F = 0.8D+02  inf= 1000  time= 0:01
  61          failed due to invalid operation
  62  it =    12  nf =      43  nj =    12  F = 0.2D-14  inf=    1  time= 0:00
  63  it =     3  nf =       4  nj =     3  F = 0.5D-09  inf=    1  time= 0:00
  64  it =     3  nf =       4  nj =     3  F = 0.1D-15  inf=    1  time= 0:00
-----------------------------------------------------------------------------
Total  it =  1397  nf =    8366  nj =  1397       succesful =  40    time= 0:19
```

```
Test for subroutine nl_huang1d:    200  variables
--------------------------------------------------------------------------------
    1  it =    41  nf =     442  nj =    41  F = 0.2D+01  inf= 1000  time= 0:04
    2  it =     6  nf =       7  nj =     6  F = 0.8D-12  inf=    1  time= 0:01
    3  it =     3  nf =       4  nj =     3  F = 0.2D-09  inf=    1  time= 0:00
    4  it =    17  nf =     139  nj =    17  F = 0.3D-09  inf=    1  time= 0:02
    5          failed due to invalid operation
    6  it =    23  nf =      24  nj =    23  F = 0.4D-08  inf=    1  time= 0:02
    7  it =    21  nf =     227  nj =    21  F = 0.1D+05  inf= 1000  time= 0:03
    8  it =    36  nf =     332  nj =    36  F = 0.1D+02  inf= 1000  time= 0:03
    9  it =    99  nf =     800  nj =    99  F = 0.2D+01  inf= 1000  time= 0:11
   10  it =     6  nf =       7  nj =     6  F = 0.9D-08  inf=    1  time= 0:01
   11  it =    11  nf =      12  nj =    11  F = 0.2D-11  inf=    1  time= 0:00
   12  it =    18  nf =      19  nj =    18  F = 0.3D-08  inf=    1  time= 0:02
   13  it =    22  nf =      23  nj =    22  F = 0.6D-08  inf=    1  time= 0:02
   14  it =    40  nf =     410  nj =    40  F = 0.1D+01  inf= 1000  time= 0:04
   15  it =     5  nf =       6  nj =     5  F = 0.6D-09  inf=    1  time= 0:00
   16  it =    54  nf =     220  nj =    54  F = 0.8D-10  inf=    1  time= 0:05
   17  it =    83  nf =     731  nj =    83  F = 0.4D+00  inf= 1000  time= 0:07
   18  it =    86  nf =     899  nj =    86  F = 0.1D+01  inf= 1000  time= 0:09
   19  it =     2  nf =       3  nj =     2  F = 0.7D-09  inf=    1  time= 0:00
   20  it =    23  nf =     228  nj =    23  F = 0.3D+02  inf= 1000  time= 0:02
   21  it =    19  nf =      20  nj =    19  F = 0.1D-11  inf=    1  time= 0:02
   22  it =    26  nf =     287  nj =    26  F = 0.4D+01  inf= 1000  time= 0:03
   23  it =    57  nf =     573  nj =    57  F = 0.7D-02  inf= 1000  time= 0:07
   24  it =     9  nf =      10  nj =     9  F = 0.1D-10  inf=    1  time= 0:01
   25  it =     4  nf =       5  nj =     4  F = 0.2D-09  inf=    1  time= 0:01
   26  it =     8  nf =       9  nj =     8  F = 0.1D-10  inf=    1  time= 0:00
   27  it =    24  nf =      25  nj =    24  F = 0.7D-12  inf=    1  time= 0:03
   28  it =    24  nf =     249  nj =    24  F = 0.5D+00  inf= 1000  time= 0:02
   29  it =    14  nf =      15  nj =    14  F = 0.6D-08  inf=    1  time= 0:02
   30  it =    24  nf =     236  nj =    24  F = 0.2D+00  inf= 1000  time= 0:02
   31  it =    20  nf =     221  nj =    20  F = 0.2D+05  inf= 1000  time= 0:02
   32          failed due to invalid operation
   33  it =   500  nf =     694  nj =   500  F = 0.9D-04  inf=  100  time= 0:49
   34  it =     4  nf =       5  nj =     4  F = 0.2D-08  inf=    1  time= 0:01
   35  it =     3  nf =       4  nj =     3  F = 0.1D-09  inf=    1  time= 0:00
   36  it =     1  nf =       2  nj =     1  F = 0.2D-15  inf=    1  time= 0:00
   37  it =     4  nf =       5  nj =     4  F = 0.5D-11  inf=    1  time= 0:01
   38  it =     2  nf =       3  nj =     2  F = 0.2D-10  inf=    1  time= 0:00
   39  it =    27  nf =     282  nj =    27  F = 0.1D+01  inf= 1000  time= 0:03
   40  it =     4  nf =       5  nj =     4  F = 0.7D-11  inf=    1  time= 0:00
   41          failed due to invalid operation
   42  it =     1  nf =       2  nj =     1  F = 0.0D+00  inf=    1  time= 0:01
   43  it =     3  nf =       4  nj =     3  F = 0.3D-12  inf=    1  time= 0:00
   44  it =     5  nf =       6  nj =     5  F = 0.7D-08  inf=    1  time= 0:00
   45  it =     3  nf =       4  nj =     3  F = 0.3D-15  inf=    1  time= 0:01
   46  it =    44  nf =     378  nj =    44  F = 0.5D-03  inf= 1000  time= 0:10
   47  it =   102  nf =     997  nj =   102  F = 0.7D+06  inf= 1000  time= 0:16
   48  it =     5  nf =       6  nj =     5  F = 0.2D-14  inf=    1  time= 0:00
   49  it =     3  nf =       4  nj =     3  F = 0.1D-08  inf=    1  time= 0:01
   50  it =     3  nf =       4  nj =     3  F = 0.2D-13  inf=    1  time= 0:01
   51  it =    19  nf =      20  nj =    19  F = 0.1D-11  inf=    1  time= 0:02
   52  it =     4  nf =       5  nj =     4  F = 0.7D-10  inf=    1  time= 0:00
   53  it =     4  nf =       5  nj =     4  F = 0.2D-14  inf=    1  time= 0:01
   54  it =    26  nf =     243  nj =    26  F = 0.1D+01  inf= 1000  time= 0:02
   55  it =     2  nf =       3  nj =     2  F = 0.1D-08  inf=    1  time= 0:01
   56  it =     4  nf =       5  nj =     4  F = 0.1D-12  inf=    1  time= 0:00
   57  it =     6  nf =       7  nj =     6  F = 0.4D-09  inf=    1  time= 0:01
   58          failed due to invalid operation
   59  it =     4  nf =       5  nj =     4  F = 0.4D-10  inf=    1  time= 0:00
   60  it =    22  nf =     225  nj =    22  F = 0.7D+02  inf= 1000  time= 0:03
   61          failed due to invalid operation
   62  it =    12  nf =      43  nj =    12  F = 0.2D-14  inf=    1  time= 0:01
   63  it =     3  nf =       4  nj =     3  F = 0.1D-09  inf=    1  time= 0:00
   64  it =     3  nf =       4  nj =     3  F = 0.3D-15  inf=    1  time= 0:00
--------------------------------------------------------------------------------
Total  it =  1648  nf =    9157  nj =  1648       succesful =  40    time= 2:58
```

```
Test for subroutine nl_huang1d:    500  variables
-----------------------------------------------------------------------------
   1  it =    70  nf =     738  nj =    70  F = 0.2D+00  inf= 1000  time= 1:54
   2  it =     6  nf =       7  nj =     6  F = 0.8D-12  inf=    1  time= 0:10
   3  it =     3  nf =       4  nj =     3  F = 0.9D-10  inf=    1  time= 0:04
   4  it =    17  nf =     139  nj =    17  F = 0.3D-09  inf=    1  time= 0:27
   5          deleted from this test (invalid operation supposed)
   6  it =    23  nf =      24  nj =    23  F = 0.4D-08  inf=    1  time= 0:37
   7  it =    21  nf =     227  nj =    21  F = 0.1D+05  inf= 1000  time= 0:33
   8  it =   107  nf =     905  nj =   107  F = 0.4D+01  inf= 1000  time= 2:53
   9  it =   159  nf =    1417  nj =   159  F = 0.3D+01  inf= 1000  time= 4:19
  10  it =    20  nf =     221  nj =    20  F = 0.4D+01  inf= 1000  time= 0:33
  11  it =    11  nf =      12  nj =    11  F = 0.2D-11  inf=    1  time= 0:13
  12  it =    18  nf =      19  nj =    18  F = 0.3D-08  inf=    1  time= 0:23
  13  it =    22  nf =      23  nj =    22  F = 0.6D-08  inf=    1  time= 0:27
  14  it =    40  nf =     410  nj =    40  F = 0.1D+01  inf= 1000  time= 1:05
  15  it =     5  nf =       6  nj =     5  F = 0.6D-09  inf=    1  time= 0:08
  16  it =    54  nf =     220  nj =    54  F = 0.8D-10  inf=    1  time= 1:07
  17  it =    83  nf =     731  nj =    83  F = 0.4D+00  inf= 1000  time= 1:44
  18  it =    56  nf =     603  nj =    56  F = 0.1D+01  inf= 1000  time= 1:31
  19  it =     2  nf =       3  nj =     2  F = 0.1D-09  inf=    1  time= 0:03
  20  it =    37  nf =     320  nj =    37  F = 0.7D+02  inf= 1000  time= 1:00
  21  it =    21  nf =      22  nj =    21  F = 0.7D-14  inf=    1  time= 0:34
  22  it =    28  nf =     302  nj =    28  F = 0.2D+01  inf= 1000  time= 0:45
  23  it =    27  nf =     288  nj =    27  F = 0.2D+00  inf= 1000  time= 0:56
  24  it =     8  nf =       9  nj =     8  F = 0.1D-09  inf=    1  time= 0:12
  25  it =     4  nf =       5  nj =     4  F = 0.2D-08  inf=    1  time= 0:06
  26  it =     9  nf =      11  nj =     9  F = 0.3D-09  inf=    1  time= 0:14
  27  it =    43  nf =     248  nj =    43  F = 0.9D-02  inf= 1000  time= 1:05
  28  it =    23  nf =     239  nj =    23  F = 0.2D+00  inf= 1000  time= 0:35
  29  it =    10  nf =      11  nj =    10  F = 0.1D-07  inf=    1  time= 0:15
  30  it =    30  nf =     297  nj =    30  F = 0.2D+00  inf= 1000  time= 0:47
  31  it =    26  nf =     255  nj =    26  F = 0.3D+04  inf= 1000  time= 0:42
  32          deleted from this test (invalid operation supposed)
  33          deleted from this test (long time supposed)
  34  it =     4  nf =       5  nj =     4  F = 0.2D-08  inf=    1  time= 0:06
  35  it =     3  nf =       4  nj =     3  F = 0.2D-10  inf=    1  time= 0:08
  36  it =     1  nf =       2  nj =     1  F = 0.2D-15  inf=    1  time= 0:01
  37  it =     4  nf =       5  nj =     4  F = 0.5D-11  inf=    1  time= 0:10
  38  it =     2  nf =       3  nj =     2  F = 0.3D-11  inf=    1  time= 0:03
  39  it =    29  nf =     304  nj =    29  F = 0.1D+01  inf= 1000  time= 0:47
  40  it =     4  nf =       5  nj =     4  F = 0.7D-11  inf=    1  time= 0:06
  41          deleted from this test (invalid operation supposed)
  42  it =     1  nf =       2  nj =     1  F = 0.0D+00  inf=    1  time= 0:02
  43  it =     2  nf =       3  nj =     2  F = 0.9D-08  inf=    1  time= 0:03
  44  it =     5  nf =       6  nj =     5  F = 0.7D-08  inf=    1  time= 0:08
  45  it =     3  nf =       4  nj =     3  F = 0.4D-15  inf=    1  time= 0:07
  46  it =    32  nf =     279  nj =    32  F = 0.3D-03  inf= 1000  time= 1:33
  47  it =    82  nf =     752  nj =    82  F = 0.1D+06  inf= 1000  time= 3:21
  48  it =     5  nf =       6  nj =     5  F = 0.2D-14  inf=    1  time= 0:08
  49  it =     4  nf =       5  nj =     4  F = 0.2D-08  inf=    1  time= 0:13
  50  it =     3  nf =       4  nj =     3  F = 0.2D-13  inf=    1  time= 0:08
  51  it =    21  nf =      22  nj =    21  F = 0.7D-14  inf=    1  time= 0:34
  52  it =     4  nf =       5  nj =     4  F = 0.1D-10  inf=    1  time= 0:06
  53  it =     4  nf =       5  nj =     4  F = 0.2D-14  inf=    1  time= 0:10
  54  it =    25  nf =     238  nj =    25  F = 0.2D+00  inf= 1000  time= 0:41
  55  it =     2  nf =       3  nj =     2  F = 0.2D-09  inf=    1  time= 0:04
  56  it =     4  nf =       5  nj =     4  F = 0.3D-12  inf=    1  time= 0:06
  57  it =     6  nf =       8  nj =     6  F = 0.2D-08  inf=    1  time= 0:10
  58          deleted from this test (invalid operation supposed)
  59  it =     4  nf =       5  nj =     4  F = 0.4D-10  inf=    1  time= 0:10
  60  it =    22  nf =     225  nj =    22  F = 0.7D+02  inf= 1000  time= 0:35
  61          deleted from this test (invalid operation supposed)
  62  it =    12  nf =      43  nj =    12  F = 0.2D-14  inf=    1  time= 0:15
  63  it =     3  nf =       4  nj =     3  F = 0.2D-10  inf=    1  time= 0:07
  64  it =     3  nf =       4  nj =     3  F = 0.4D-15  inf=    1  time= 0:08
-----------------------------------------------------------------------------
Total  it =  1277  nf =    9672  nj =  1277       succesful =  38    time=35:32
```

```
Test for subroutine nl_huang2d:    100  variables
-----------------------------------------------------------------------------
    1  it =    56  nf =     607  nj =    56  F = 0.4D+00  inf= 1000  time= 0:01
    2  it =     6  nf =       7  nj =     6  F = 0.8D-12  inf=    1  time= 0:00
    3  it =     3  nf =       4  nj =     3  F = 0.4D-09  inf=    1  time= 0:00
    4  it =    17  nf =     139  nj =    17  F = 0.3D-09  inf=    1  time= 0:00
    5          failed due to invalid operation
    6  it =    23  nf =      24  nj =    23  F = 0.4D-08  inf=    1  time= 0:00
    7  it =    21  nf =     227  nj =    21  F = 0.1D+05  inf= 1000  time= 0:01
    8  it =    24  nf =     234  nj =    24  F = 0.4D+02  inf= 1000  time= 0:00
    9  it =    99  nf =     890  nj =    99  F = 0.2D+01  inf= 1000  time= 0:01
   10  it =     6  nf =       7  nj =     6  F = 0.2D-08  inf=    1  time= 0:00
   11  it =    11  nf =      12  nj =    11  F = 0.2D-11  inf=    1  time= 0:00
   12  it =    18  nf =      19  nj =    18  F = 0.3D-08  inf=    1  time= 0:00
   13  it =    22  nf =      23  nj =    22  F = 0.6D-08  inf=    1  time= 0:00
   14  it =    21  nf =     223  nj =    21  F = 0.1D+01  inf= 1000  time= 0:00
   15  it =     5  nf =       6  nj =     5  F = 0.6D-09  inf=    1  time= 0:00
   16  it =    54  nf =     220  nj =    54  F = 0.6D-10  inf=    1  time= 0:01
   17  it =    83  nf =     731  nj =    83  F = 0.4D+00  inf= 1000  time= 0:01
   18  it =    61  nf =     654  nj =    61  F = 0.1D+01  inf= 1000  time= 0:00
   19  it =     2  nf =       3  nj =     2  F = 0.3D-08  inf=    1  time= 0:00
   20  it =    29  nf =     264  nj =    29  F = 0.1D+02  inf= 1000  time= 0:01
   21  it =    17  nf =      18  nj =    17  F = 0.9D-08  inf=    1  time= 0:00
   22  it =    30  nf =     331  nj =    30  F = 0.5D+01  inf= 1000  time= 0:00
   23  it =    51  nf =     541  nj =    51  F = 0.4D+00  inf= 1000  time= 0:01
   24  it =   114  nf =    1149  nj =   114  F = 0.3D-03  inf= 1000  time= 0:01
   25  it =     4  nf =       5  nj =     4  F = 0.8D-11  inf=    1  time= 0:00
   26  it =     9  nf =      11  nj =     9  F = 0.6D-12  inf=    1  time= 0:00
   27  it =    19  nf =      20  nj =    19  F = 0.2D-12  inf=    1  time= 0:00
   28  it =    20  nf =     221  nj =    20  F = 0.1D+01  inf= 1000  time= 0:00
   29  it =    16  nf =      17  nj =    16  F = 0.4D-08  inf=    1  time= 0:01
   30  it =    27  nf =     278  nj =    27  F = 0.3D+00  inf= 1000  time= 0:00
   31  it =    20  nf =     221  nj =    20  F = 0.5D+05  inf= 1000  time= 0:00
   32          failed due to invalid operation
   33  it =   321  nf =     323  nj =   321  F = 0.1D-07  inf=    1  time= 0:03
   34  it =     4  nf =       5  nj =     4  F = 0.2D-08  inf=    1  time= 0:00
   35  it =     3  nf =       4  nj =     3  F = 0.5D-09  inf=    1  time= 0:00
   36  it =     1  nf =       2  nj =     1  F = 0.2D-15  inf=    1  time= 0:00
   37  it =     4  nf =       5  nj =     4  F = 0.6D-11  inf=    1  time= 0:00
   38  it =     2  nf =       3  nj =     2  F = 0.8D-10  inf=    1  time= 0:00
   39  it =    21  nf =     224  nj =    21  F = 0.1D+01  inf= 1000  time= 0:00
   40  it =     4  nf =       5  nj =     4  F = 0.7D-11  inf=    1  time= 0:00
   41          failed due to invalid operation
   42  it =     1  nf =       2  nj =     1  F = 0.0D+00  inf=    1  time= 0:00
   43  it =     3  nf =       4  nj =     3  F = 0.9D-12  inf=    1  time= 0:00
   44  it =     5  nf =       6  nj =     5  F = 0.7D-08  inf=    1  time= 0:00
   45  it =     3  nf =       4  nj =     3  F = 0.1D-15  inf=    1  time= 0:00
   46  it =    23  nf =     238  nj =    23  F = 0.3D-02  inf= 1000  time= 0:01
   47  it =   199  nf =    1778  nj =   199  F = 0.5D+06  inf= 1000  time= 0:04
   48  it =     5  nf =       6  nj =     5  F = 0.2D-14  inf=    1  time= 0:00
   49  it =     3  nf =       4  nj =     3  F = 0.1D-09  inf=    1  time= 0:00
   50  it =     3  nf =       4  nj =     3  F = 0.2D-13  inf=    1  time= 0:00
   51  it =    17  nf =      18  nj =    17  F = 0.9D-08  inf=    1  time= 0:00
   52  it =     4  nf =       5  nj =     4  F = 0.2D-09  inf=    1  time= 0:00
   53  it =     4  nf =       5  nj =     4  F = 0.2D-14  inf=    1  time= 0:00
   54  it =    23  nf =     230  nj =    23  F = 0.5D+01  inf= 1000  time= 0:00
   55  it =     2  nf =       3  nj =     2  F = 0.5D-08  inf=    1  time= 0:00
   56  it =     4  nf =       5  nj =     4  F = 0.4D-13  inf=    1  time= 0:00
   57  it =     6  nf =       7  nj =     6  F = 0.2D-13  inf=    1  time= 0:01
   58          failed due to invalid operation
   59  it =     4  nf =       5  nj =     4  F = 0.4D-10  inf=    1  time= 0:00
   60  it =   102  nf =     945  nj =   102  F = 0.3D+01  inf= 1000  time= 0:01
   61          failed due to invalid operation
   62  it =    12  nf =      43  nj =    12  F = 0.2D-14  inf=    1  time= 0:00
   63  it =     3  nf =       4  nj =     3  F = 0.5D-09  inf=    1  time= 0:00
   64  it =     3  nf =       4  nj =     3  F = 0.1D-15  inf=    1  time= 0:00
-----------------------------------------------------------------------------
Total  it =  1677  nf =   10997  nj =  1677       succesful =  40    time= 0:19
```

```
Test for subroutine nl_huang2d:    200  variables
------------------------------------------------------------------------------
    1  it =    37  nf =     390  nj =    37  F = 0.1D+01  inf= 1000  time= 0:02
    2  it =     6  nf =       7  nj =     6  F = 0.8D-12  inf=    1  time= 0:01
    3  it =     3  nf =       4  nj =     3  F = 0.2D-09  inf=    1  time= 0:00
    4  it =    17  nf =     139  nj =    17  F = 0.3D-09  inf=    1  time= 0:01
    5          failed due to invalid operation
    6  it =    23  nf =      24  nj =    23  F = 0.4D-08  inf=    1  time= 0:02
    7  it =    21  nf =     227  nj =    21  F = 0.1D+05  inf= 1000  time= 0:01
    8  it =    30  nf =     279  nj =    30  F = 0.1D+02  inf= 1000  time= 0:02
    9  it =   117  nf =     969  nj =   117  F = 0.3D+01  inf= 1000  time= 0:08
   10  it =     6  nf =       7  nj =     6  F = 0.9D-08  inf=    1  time= 0:01
   11  it =    11  nf =      12  nj =    11  F = 0.2D-11  inf=    1  time= 0:00
   12  it =    18  nf =      19  nj =    18  F = 0.3D-08  inf=    1  time= 0:01
   13  it =    22  nf =      23  nj =    22  F = 0.6D-08  inf=    1  time= 0:02
   14  it =    21  nf =     223  nj =    21  F = 0.1D+01  inf= 1000  time= 0:01
   15  it =     5  nf =       6  nj =     5  F = 0.6D-09  inf=    1  time= 0:01
   16  it =    54  nf =     220  nj =    54  F = 0.6D-10  inf=    1  time= 0:03
   17  it =    83  nf =     731  nj =    83  F = 0.4D+00  inf= 1000  time= 0:05
   18  it =    56  nf =     591  nj =    56  F = 0.1D+01  inf= 1000  time= 0:04
   19  it =     2  nf =       3  nj =     2  F = 0.7D-09  inf=    1  time= 0:00
   20  it =    23  nf =     228  nj =    23  F = 0.3D+02  inf= 1000  time= 0:01
   21  it =    19  nf =      20  nj =    19  F = 0.1D-11  inf=    1  time= 0:02
   22  it =    28  nf =     309  nj =    28  F = 0.4D+01  inf= 1000  time= 0:01
   23  it =    41  nf =     401  nj =    41  F = 0.8D-02  inf= 1000  time= 0:04
   24  it =     9  nf =      10  nj =     9  F = 0.1D-10  inf=    1  time= 0:01
   25  it =     4  nf =       5  nj =     4  F = 0.2D-09  inf=    1  time= 0:00
   26  it =     9  nf =      11  nj =     9  F = 0.1D-11  inf=    1  time= 0:01
   27  it =    24  nf =      25  nj =    24  F = 0.7D-12  inf=    1  time= 0:01
   28  it =    24  nf =     249  nj =    24  F = 0.5D+00  inf= 1000  time= 0:02
   29  it =    14  nf =      15  nj =    14  F = 0.6D-08  inf=    1  time= 0:01
   30  it =    24  nf =     236  nj =    24  F = 0.2D+00  inf= 1000  time= 0:02
   31  it =    20  nf =     221  nj =    20  F = 0.2D+05  inf= 1000  time= 0:02
   32          failed due to invalid operation
   33  it =   500  nf =     694  nj =   500  F = 0.9D-04  inf=  100  time= 0:30
   34  it =     4  nf =       5  nj =     4  F = 0.2D-08  inf=    1  time= 0:00
   35  it =     3  nf =       4  nj =     3  F = 0.1D-09  inf=    1  time= 0:01
   36  it =     1  nf =       2  nj =     1  F = 0.2D-15  inf=    1  time= 0:00
   37  it =     4  nf =       5  nj =     4  F = 0.5D-11  inf=    1  time= 0:00
   38  it =     2  nf =       3  nj =     2  F = 0.2D-10  inf=    1  time= 0:01
   39  it =    21  nf =     224  nj =    21  F = 0.1D+01  inf= 1000  time= 0:01
   40  it =     4  nf =       5  nj =     4  F = 0.7D-11  inf=    1  time= 0:00
   41          failed due to invalid operation
   42  it =     1  nf =       2  nj =     1  F = 0.0D+00  inf=    1  time= 0:00
   43  it =     3  nf =       4  nj =     3  F = 0.3D-12  inf=    1  time= 0:00
   44  it =     5  nf =       6  nj =     5  F = 0.7D-08  inf=    1  time= 0:01
   45  it =     3  nf =       4  nj =     3  F = 0.3D-15  inf=    1  time= 0:00
   46  it =    35  nf =     294  nj =    35  F = 0.6D-03  inf= 1000  time= 0:07
   47  it =   143  nf =    1378  nj =   143  F = 0.1D+06  inf= 1000  time= 0:18
   48  it =     5  nf =       6  nj =     5  F = 0.2D-14  inf=    1  time= 0:01
   49  it =     3  nf =       4  nj =     3  F = 0.1D-08  inf=    1  time= 0:01
   50  it =     3  nf =       4  nj =     3  F = 0.2D-13  inf=    1  time= 0:00
   51  it =    19  nf =      20  nj =    19  F = 0.1D-11  inf=    1  time= 0:01
   52  it =     4  nf =       5  nj =     4  F = 0.7D-10  inf=    1  time= 0:00
   53  it =     4  nf =       5  nj =     4  F = 0.1D-14  inf=    1  time= 0:01
   54  it =    26  nf =     243  nj =    26  F = 0.1D+01  inf= 1000  time= 0:02
   55  it =     2  nf =       3  nj =     2  F = 0.1D-08  inf=    1  time= 0:00
   56  it =     4  nf =       5  nj =     4  F = 0.1D-12  inf=    1  time= 0:00
   57  it =     6  nf =       7  nj =     6  F = 0.4D-09  inf=    1  time= 0:01
   58          failed due to invalid operation
   59  it =     4  nf =       5  nj =     4  F = 0.4D-10  inf=    1  time= 0:00
   60  it =    22  nf =     225  nj =    22  F = 0.7D+02  inf= 1000  time= 0:02
   61          failed due to invalid operation
   62  it =    12  nf =      43  nj =    12  F = 0.2D-14  inf=    1  time= 0:00
   63  it =     3  nf =       4  nj =     3  F = 0.1D-09  inf=    1  time= 0:01
   64  it =     3  nf =       4  nj =     3  F = 0.3D-15  inf=    1  time= 0:00
------------------------------------------------------------------------------
Total  it =  1620  nf =    8817  nj =  1620       succesful =  40    time= 2:02
```

```
Test for subroutine nl_huang2d:    500  variables
-------------------------------------------------------------------------------
   1  it =    34  nf =     349  nj =    34  F = 0.4D+00  inf= 1000  time= 0:32
   2  it =     6  nf =       7  nj =     6  F = 0.8D-12  inf=    1  time= 0:12
   3  it =     3  nf =       4  nj =     3  F = 0.9D-10  inf=    1  time= 0:03
   4  it =    17  nf =     139  nj =    17  F = 0.3D-09  inf=    1  time= 0:16
   5          deleted from this test (invalid operation supposed)
   6  it =    23  nf =      24  nj =    23  F = 0.4D-08  inf=    1  time= 0:22
   7  it =    21  nf =     227  nj =    21  F = 0.1D+05  inf= 1000  time= 0:20
   8  it =    30  nf =     302  nj =    30  F = 0.1D+02  inf= 1000  time= 0:28
   9  it =    59  nf =     434  nj =    59  F = 0.3D+01  inf= 1000  time= 0:57
  10  it =    20  nf =     221  nj =    20  F = 0.4D+01  inf= 1000  time= 0:39
  11  it =    11  nf =      12  nj =    11  F = 0.2D-11  inf=    1  time= 0:11
  12  it =    18  nf =      19  nj =    18  F = 0.3D-08  inf=    1  time= 0:17
  13  it =    22  nf =      23  nj =    22  F = 0.6D-08  inf=    1  time= 0:20
  14  it =    21  nf =     223  nj =    21  F = 0.1D+01  inf= 1000  time= 0:20
  15  it =     5  nf =       6  nj =     5  F = 0.6D-09  inf=    1  time= 0:05
  16  it =    54  nf =     220  nj =    54  F = 0.6D-10  inf=    1  time= 0:51
  17  it =    83  nf =     731  nj =    83  F = 0.4D+00  inf= 1000  time= 1:19
  18  it =    60  nf =     653  nj =    60  F = 0.1D+01  inf= 1000  time= 0:58
  19  it =     2  nf =       3  nj =     2  F = 0.1D-09  inf=    1  time= 0:02
  20  it =    38  nf =     324  nj =    38  F = 0.6D+02  inf= 1000  time= 0:36
  21  it =    21  nf =      22  nj =    21  F = 0.7D-14  inf=    1  time= 0:20
  22  it =    29  nf =     315  nj =    29  F = 0.3D+01  inf= 1000  time= 0:28
  23  it =    62  nf =     660  nj =    62  F = 0.7D-01  inf= 1000  time= 1:33
  24  it =     8  nf =       9  nj =     8  F = 0.1D-09  inf=    1  time= 0:08
  25  it =     4  nf =       5  nj =     4  F = 0.2D-08  inf=    1  time= 0:04
  26  it =    10  nf =      13  nj =    10  F = 0.2D-11  inf=    1  time= 0:10
  27  it =    43  nf =     248  nj =    43  F = 0.9D-02  inf= 1000  time= 0:44
  28  it =    23  nf =     239  nj =    23  F = 0.2D+00  inf= 1000  time= 0:23
  29  it =    10  nf =      11  nj =    10  F = 0.1D-07  inf=    1  time= 0:11
  30  it =    30  nf =     297  nj =    30  F = 0.2D+00  inf= 1000  time= 0:35
  31  it =    26  nf =     255  nj =    26  F = 0.3D+04  inf= 1000  time= 0:25
  32          deleted from this test (invalid operation supposed)
  33          deleted from this test (long time supposed)
  34  it =     4  nf =       5  nj =     4  F = 0.2D-08  inf=    1  time= 0:04
  35  it =     3  nf =       4  nj =     3  F = 0.2D-10  inf=    1  time= 0:06
  36  it =     1  nf =       2  nj =     1  F = 0.2D-15  inf=    1  time= 0:01
  37  it =     4  nf =       5  nj =     4  F = 0.5D-11  inf=    1  time= 0:08
  38  it =     2  nf =       3  nj =     2  F = 0.3D-11  inf=    1  time= 0:02
  39  it =    21  nf =     224  nj =    21  F = 0.1D+01  inf= 1000  time= 0:20
  40  it =     4  nf =       5  nj =     4  F = 0.7D-11  inf=    1  time= 0:04
  41          deleted from this test (invalid operation supposed)
  42  it =     1  nf =       2  nj =     1  F = 0.0D+00  inf=    1  time= 0:01
  43  it =     2  nf =       3  nj =     2  F = 0.9D-08  inf=    1  time= 0:02
  44  it =     5  nf =       6  nj =     5  F = 0.7D-08  inf=    1  time= 0:05
  45  it =     3  nf =       4  nj =     3  F = 0.4D-15  inf=    1  time= 0:06
  46  it =    32  nf =     278  nj =    32  F = 0.3D-03  inf= 1000  time= 1:20
  47  it =   321  nf =    3158  nj =   321  F = 0.1D+05  inf= 1000  time=11:00
  48  it =     5  nf =       6  nj =     5  F = 0.2D-14  inf=    1  time= 0:04
  49  it =     4  nf =       5  nj =     4  F = 0.2D-08  inf=    1  time= 0:12
  50  it =     3  nf =       4  nj =     3  F = 0.2D-13  inf=    1  time= 0:07
  51  it =    21  nf =      22  nj =    21  F = 0.7D-14  inf=    1  time= 0:20
  52  it =     4  nf =       5  nj =     4  F = 0.1D-10  inf=    1  time= 0:04
  53  it =     4  nf =       5  nj =     4  F = 0.2D-14  inf=    1  time= 0:08
  54  it =    25  nf =     238  nj =    25  F = 0.2D+00  inf= 1000  time= 0:24
  55  it =     2  nf =       3  nj =     2  F = 0.2D-09  inf=    1  time= 0:03
  56  it =     4  nf =       5  nj =     4  F = 0.3D-12  inf=    1  time= 0:05
  57  it =     6  nf =       8  nj =     6  F = 0.2D-08  inf=    1  time= 0:06
  58          deleted from this test (invalid operation supposed)
  59  it =     4  nf =       5  nj =     4  F = 0.4D-10  inf=    1  time= 0:09
  60  it =    22  nf =     225  nj =    22  F = 0.7D+02  inf= 1000  time= 0:21
  61          deleted from this test (invalid operation supposed)
  62  it =    12  nf =      43  nj =    12  F = 0.2D-14  inf=    1  time= 0:11
  63  it =     3  nf =       4  nj =     3  F = 0.2D-10  inf=    1  time= 0:06
  64  it =     3  nf =       4  nj =     3  F = 0.4D-15  inf=    1  time= 0:06
-------------------------------------------------------------------------------
Total  it =  1318  nf =   10276  nj =  1318      succesful =  38    time=29:34
```

```
Test for subroutine nl_ilud:    100  variables
-------------------------------------------------------------------------------
   1  it =    23  nf =     253  nj =    23  F = 0.2D+01  inf= 1000  time= 0:01
   2  it =    36  nf =     359  nj =    36  F = 0.9D+00  inf= 1000  time= 0:00
   3  it =     3  nf =       4  nj =     3  F = 0.3D-09  inf=    1  time= 0:00
   4  it =    18  nf =     149  nj =    18  F = 0.6D-13  inf=    1  time= 0:00
   5          failed due to invalid operation
   6  it =    17  nf =      18  nj =    17  F = 0.5D-08  inf=    1  time= 0:00
   7  it =    43  nf =     391  nj =    43  F = 0.2D+03  inf= 1000  time= 0:00
   8  it =    60  nf =     551  nj =    60  F = 0.3D+01  inf= 1000  time= 0:00
   9  it =    62  nf =     570  nj =    62  F = 0.3D+01  inf= 1000  time= 0:01
  10  it =     5  nf =       6  nj =     5  F = 0.8D-13  inf=    1  time= 0:00
  11          failed due to invalid operation
  12  it =    22  nf =     228  nj =    22  F = 0.6D+01  inf= 1000  time= 0:00
  13  it =    17  nf =      27  nj =    17  F = 0.4D-08  inf=    1  time= 0:00
  14  it =     4  nf =       5  nj =     4  F = 0.2D-11  inf=    1  time= 0:00
  15  it =     5  nf =       6  nj =     5  F = 0.3D-09  inf=    1  time= 0:00
  16  it =    54  nf =     220  nj =    54  F = 0.8D-10  inf=    1  time= 0:00
  17  it =    63  nf =     550  nj =    63  F = 0.2D+00  inf= 1000  time= 0:01
  18  it =    81  nf =     844  nj =    81  F = 0.1D+01  inf= 1000  time= 0:00
  19  it =     2  nf =       3  nj =     2  F = 0.2D-09  inf=    1  time= 0:00
  20  it =    31  nf =     287  nj =    31  F = 0.1D+03  inf= 1000  time= 0:00
  21  it =    12  nf =      13  nj =    12  F = 0.2D-08  inf=    1  time= 0:00
  22  it =    40  nf =     441  nj =    40  F = 0.5D+01  inf= 1000  time= 0:01
  23  it =    37  nf =     399  nj =    37  F = 0.1D+01  inf= 1000  time= 0:00
  24  it =    26  nf =     237  nj =    26  F = 0.3D-03  inf= 1000  time= 0:00
  25  it =     4  nf =       5  nj =     4  F = 0.3D-14  inf=    1  time= 0:00
  26  it =     8  nf =      10  nj =     8  F = 0.5D-12  inf=    1  time= 0:00
  27  it =    10  nf =      11  nj =    10  F = 0.2D-11  inf=    1  time= 0:00
  28  it =    23  nf =     254  nj =    23  F = 0.1D+01  inf= 1000  time= 0:00
  29  it =    13  nf =      14  nj =    13  F = 0.9D-08  inf=    1  time= 0:00
  30  it =    26  nf =     242  nj =    26  F = 0.2D+00  inf= 1000  time= 0:00
  31  it =    15  nf =      36  nj =    15  F = 0.6D-09  inf=    1  time= 0:01
  32          failed due to invalid operation
  33  it =   200  nf =     460  nj =   200  F = 0.1D+00  inf= 1000  time= 0:00
  34  it =     4  nf =       5  nj =     4  F = 0.2D-08  inf=    1  time= 0:01
  35  it =     9  nf =      10  nj =     9  F = 0.1D-09  inf=    1  time= 0:00
  36  it =     1  nf =       2  nj =     1  F = 0.2D-15  inf=    1  time= 0:00
  37  it =    21  nf =     225  nj =    21  F = 0.6D+00  inf= 1000  time= 0:00
  38  it =     2  nf =       3  nj =     2  F = 0.1D-10  inf=    1  time= 0:00
  39  it =     4  nf =       6  nj =     4  F = 0.8D-08  inf=    1  time= 0:00
  40  it =     4  nf =       5  nj =     4  F = 0.3D-11  inf=    1  time= 0:00
  41          failed due to invalid operation
  42  it =     1  nf =       2  nj =     1  F = 0.0D+00  inf=    1  time= 0:00
  43  it =     2  nf =       3  nj =     2  F = 0.4D-08  inf=    1  time= 0:00
  44  it =     5  nf =       6  nj =     5  F = 0.8D-08  inf=    1  time= 0:00
  45  it =     3  nf =       4  nj =     3  F = 0.2D-15  inf=    1  time= 0:00
  46  it =     5  nf =       9  nj =     5  F = 0.5D-09  inf=    1  time= 0:00
  47          failed due to invalid operation
  48  it =     4  nf =       5  nj =     4  F = 0.8D-09  inf=    1  time= 0:00
  49  it =     3  nf =       4  nj =     3  F = 0.5D-10  inf=    1  time= 0:00
  50  it =     3  nf =       4  nj =     3  F = 0.1D-13  inf=    1  time= 0:00
  51  it =    12  nf =      13  nj =    12  F = 0.2D-08  inf=    1  time= 0:00
  52  it =    23  nf =     243  nj =    23  F = 0.2D-03  inf= 1000  time= 0:00
  53  it =     3  nf =       4  nj =     3  F = 0.2D-08  inf=    1  time= 0:00
  54  it =     6  nf =      14  nj =     6  F = 0.5D-11  inf=    1  time= 0:01
  55  it =     2  nf =       3  nj =     2  F = 0.9D-09  inf=    1  time= 0:00
  56  it =     3  nf =       4  nj =     3  F = 0.4D-10  inf=    1  time= 0:00
  57  it =     4  nf =       5  nj =     4  F = 0.3D-13  inf=    1  time= 0:00
  58          failed due to invalid operation
  59  it =     4  nf =       5  nj =     4  F = 0.8D-14  inf=    1  time= 0:00
  60  it =    88  nf =     807  nj =    88  F = 0.2D+01  inf= 1000  time= 0:00
  61          failed due to invalid operation
  62  it =    10  nf =      38  nj =    10  F = 0.0D+00  inf=    1  time= 0:00
  63  it =     9  nf =      10  nj =     9  F = 0.1D-09  inf=    1  time= 0:00
  64  it =     3  nf =       4  nj =     3  F = 0.2D-15  inf=    1  time= 0:00
-------------------------------------------------------------------------------
Total  it =  1198  nf =    8036  nj =  1198       succesful =  39    time= 0:07
```

```
Test for subroutine nl_ilud:    200  variables
-----------------------------------------------------------------------------
    1  it =    38  nf =     419  nj =    38  F = 0.2D+01  inf= 1000  time= 0:01
    2          failed due to invalid operation
    3  it =     3  nf =       4  nj =     3  F = 0.2D-09  inf=    1  time= 0:00
    4  it =    18  nf =     149  nj =    18  F = 0.6D-13  inf=    1  time= 0:01
    5          failed due to invalid operation
    6  it =    17  nf =      18  nj =    17  F = 0.5D-08  inf=    1  time= 0:00
    7  it =    43  nf =     391  nj =    43  F = 0.2D+03  inf= 1000  time= 0:01
    8  it =   105  nf =    1005  nj =   105  F = 0.3D+01  inf= 1000  time= 0:03
    9  it =   103  nf =    1040  nj =   103  F = 0.3D+01  inf= 1000  time= 0:03
   10  it =     5  nf =       6  nj =     5  F = 0.8D-13  inf=    1  time= 0:00
   11          failed due to invalid operation
   12  it =    22  nf =     228  nj =    22  F = 0.6D+01  inf= 1000  time= 0:01
   13  it =    17  nf =      28  nj =    17  F = 0.4D-08  inf=    1  time= 0:01
   14  it =     4  nf =       5  nj =     4  F = 0.2D-11  inf=    1  time= 0:00
   15  it =     5  nf =       6  nj =     5  F = 0.3D-09  inf=    1  time= 0:00
   16  it =    54  nf =     220  nj =    54  F = 0.8D-10  inf=    1  time= 0:01
   17  it =    63  nf =     550  nj =    63  F = 0.2D+00  inf= 1000  time= 0:02
   18  it =   111  nf =    1199  nj =   111  F = 0.1D+01  inf= 1000  time= 0:05
   19  it =     2  nf =       3  nj =     2  F = 0.5D-10  inf=    1  time= 0:00
   20  it =    36  nf =     302  nj =    36  F = 0.4D+02  inf= 1000  time= 0:01
   21  it =    12  nf =      13  nj =    12  F = 0.6D-09  inf=    1  time= 0:01
   22  it =    77  nf =     848  nj =    77  F = 0.4D+01  inf= 1000  time= 0:02
   23  it =    40  nf =     433  nj =    40  F = 0.9D+00  inf= 1000  time= 0:02
   24  it =     8  nf =       9  nj =     8  F = 0.2D-09  inf=    1  time= 0:00
   25  it =     4  nf =       5  nj =     4  F = 0.4D-14  inf=    1  time= 0:00
   26  it =     8  nf =      10  nj =     8  F = 0.2D-11  inf=    1  time= 0:00
   27  it =    11  nf =      12  nj =    11  F = 0.8D-11  inf=    1  time= 0:01
   28  it =    67  nf =     736  nj =    67  F = 0.6D+00  inf= 1000  time= 0:02
   29  it =    12  nf =      13  nj =    12  F = 0.8D-08  inf=    1  time= 0:00
   30  it =    24  nf =     233  nj =    24  F = 0.2D+00  inf= 1000  time= 0:01
   31  it =    15  nf =      26  nj =    15  F = 0.2D-08  inf=    1  time= 0:01
   32          failed due to invalid operation
   33  it =   500  nf =    3211  nj =   500  F = 0.2D+01  inf=  100  time= 0:14
   34  it =     4  nf =       5  nj =     4  F = 0.2D-08  inf=    1  time= 0:00
   35  it =    10  nf =      11  nj =    10  F = 0.2D-10  inf=    1  time= 0:01
   36  it =     1  nf =       2  nj =     1  F = 0.2D-15  inf=    1  time= 0:00
   37  it =    25  nf =     260  nj =    25  F = 0.6D+00  inf= 1000  time= 0:01
   38  it =     2  nf =       3  nj =     2  F = 0.3D-11  inf=    1  time= 0:00
   39  it =     4  nf =       6  nj =     4  F = 0.8D-08  inf=    1  time= 0:00
   40  it =     4  nf =       5  nj =     4  F = 0.3D-11  inf=    1  time= 0:00
   41          failed due to invalid operation
   42  it =     1  nf =       2  nj =     1  F = 0.0D+00  inf=    1  time= 0:00
   43  it =     2  nf =       3  nj =     2  F = 0.9D-09  inf=    1  time= 0:00
   44  it =     5  nf =       6  nj =     5  F = 0.8D-08  inf=    1  time= 0:01
   45  it =     3  nf =       4  nj =     3  F = 0.2D-15  inf=    1  time= 0:00
   46  it =     6  nf =      11  nj =     6  F = 0.5D-11  inf=    1  time= 0:00
   47          failed due to invalid operation
   48  it =     4  nf =       5  nj =     4  F = 0.8D-09  inf=    1  time= 0:00
   49  it =     3  nf =       4  nj =     3  F = 0.2D-08  inf=    1  time= 0:01
   50  it =     3  nf =       4  nj =     3  F = 0.1D-13  inf=    1  time= 0:00
   51  it =    12  nf =      13  nj =    12  F = 0.6D-09  inf=    1  time= 0:01
   52  it =    25  nf =     266  nj =    25  F = 0.5D-04  inf= 1000  time= 0:00
   53  it =     3  nf =       4  nj =     3  F = 0.2D-08  inf=    1  time= 0:01
   54  it =     6  nf =      15  nj =     6  F = 0.9D-11  inf=    1  time= 0:00
   55  it =     2  nf =       3  nj =     2  F = 0.2D-09  inf=    1  time= 0:00
   56  it =     3  nf =       4  nj =     3  F = 0.2D-10  inf=    1  time= 0:00
   57  it =     4  nf =       5  nj =     4  F = 0.4D-13  inf=    1  time= 0:00
   58          failed due to invalid operation
   59  it =     4  nf =       5  nj =     4  F = 0.6D-14  inf=    1  time= 0:00
   60          failed due to invalid operation
   61          failed due to invalid operation
   62  it =    10  nf =      38  nj =    10  F = 0.0D+00  inf=    1  time= 0:01
   63  it =    10  nf =      11  nj =    10  F = 0.2D-10  inf=    1  time= 0:00
   64  it =     3  nf =       4  nj =     3  F = 0.2D-15  inf=    1  time= 0:00
-----------------------------------------------------------------------------
Total  it =  1583  nf =   11821  nj =  1583      succesful =  40    time= 0:51
```

```
Test for subroutine nl_ilud:    500  variables
-------------------------------------------------------------------------------
   1  it =    28  nf =     309  nj =    28  F = 0.2D+01  inf= 1000  time= 0:11
   2          deleted from this test (invalid operation supposed)
   3  it =     3  nf =       4  nj =     3  F = 0.9D-10  inf=    1  time= 0:02
   4  it =    18  nf =     149  nj =    18  F = 0.6D-13  inf=    1  time= 0:07
   5          deleted from this test (invalid operation supposed)
   6  it =    17  nf =      18  nj =    17  F = 0.5D-08  inf=    1  time= 0:08
   7  it =    43  nf =     391  nj =    43  F = 0.2D+03  inf= 1000  time= 0:17
   8  it =   178  nf =    1865  nj =   178  F = 0.4D+01  inf= 1000  time= 1:11
   9  it =    73  nf =     741  nj =    73  F = 0.3D+01  inf= 1000  time= 0:30
  10  it =     5  nf =       6  nj =     5  F = 0.8D-13  inf=    1  time= 0:02
  11          deleted from this test (invalid operation supposed)
  12  it =    22  nf =     228  nj =    22  F = 0.6D+01  inf= 1000  time= 0:09
  13  it =    17  nf =      28  nj =    17  F = 0.4D-08  inf=    1  time= 0:07
  14  it =     4  nf =       5  nj =     4  F = 0.2D-11  inf=    1  time= 0:01
  15  it =     5  nf =       6  nj =     5  F = 0.3D-09  inf=    1  time= 0:02
  16  it =    54  nf =     220  nj =    54  F = 0.8D-10  inf=    1  time= 0:21
  17  it =    63  nf =     550  nj =    63  F = 0.2D+00  inf= 1000  time= 0:25
  18  it =    49  nf =     536  nj =    49  F = 0.1D+01  inf= 1000  time= 0:19
  19  it =     2  nf =       3  nj =     2  F = 0.7D-11  inf=    1  time= 0:01
  20  it =    29  nf =     276  nj =    29  F = 0.2D+03  inf= 1000  time= 0:11
  21  it =    12  nf =      13  nj =    12  F = 0.9D-10  inf=    1  time= 0:05
  22  it =    53  nf =     584  nj =    53  F = 0.3D+01  inf= 1000  time= 0:21
  23  it =    45  nf =     496  nj =    45  F = 0.8D+00  inf= 1000  time= 0:31
  24  it =     7  nf =       8  nj =     7  F = 0.3D-09  inf=    1  time= 0:03
  25  it =     3  nf =       4  nj =     3  F = 0.7D-08  inf=    1  time= 0:01
  26  it =     7  nf =       9  nj =     7  F = 0.2D-11  inf=    1  time= 0:03
  27  it =    13  nf =      14  nj =    13  F = 0.2D-10  inf=    1  time= 0:05
  28  it =    25  nf =     276  nj =    25  F = 0.2D+00  inf= 1000  time= 0:10
  29  it =    10  nf =      11  nj =    10  F = 0.5D-08  inf=    1  time= 0:05
  30  it =    40  nf =     410  nj =    40  F = 0.9D-01  inf= 1000  time= 0:17
  31  it =    15  nf =      26  nj =    15  F = 0.3D-09  inf=    1  time= 0:06
  32          deleted from this test (invalid operation supposed)
  33  it =    22  nf =     223  nj =    22  F = 0.1D+02  inf= 1000  time= 0:09
  34  it =     4  nf =       5  nj =     4  F = 0.2D-08  inf=    1  time= 0:01
  35  it =    11  nf =      12  nj =    11  F = 0.6D-10  inf=    1  time= 0:09
  36  it =     1  nf =       2  nj =     1  F = 0.2D-15  inf=    1  time= 0:01
  37  it =    21  nf =     227  nj =    21  F = 0.7D+00  inf= 1000  time= 0:18
  38  it =     2  nf =       3  nj =     2  F = 0.5D-12  inf=    1  time= 0:01
  39  it =     4  nf =       6  nj =     4  F = 0.8D-08  inf=    1  time= 0:01
  40  it =     4  nf =       5  nj =     4  F = 0.3D-11  inf=    1  time= 0:02
  41          deleted from this test (invalid operation supposed)
  42  it =     1  nf =       2  nj =     1  F = 0.0D+00  inf=    1  time= 0:00
  43  it =     2  nf =       3  nj =     2  F = 0.1D-09  inf=    1  time= 0:01
  44  it =     5  nf =       6  nj =     5  F = 0.8D-08  inf=    1  time= 0:02
  45  it =     3  nf =       4  nj =     3  F = 0.4D-15  inf=    1  time= 0:03
  46  it =     6  nf =      12  nj =     6  F = 0.2D-09  inf=    1  time= 0:06
  47          deleted from this test (invalid operation supposed)
  48  it =     4  nf =       5  nj =     4  F = 0.8D-09  inf=    1  time= 0:01
  49  it =     4  nf =       5  nj =     4  F = 0.2D-08  inf=    1  time= 0:08
  50  it =     3  nf =       4  nj =     3  F = 0.1D-13  inf=    1  time= 0:02
  51  it =    12  nf =      13  nj =    12  F = 0.9D-10  inf=    1  time= 0:05
  52  it =    27  nf =     288  nj =    27  F = 0.8D-05  inf= 1000  time= 0:11
  53  it =     3  nf =       4  nj =     3  F = 0.2D-08  inf=    1  time= 0:02
  54  it =     6  nf =      15  nj =     6  F = 0.7D-08  inf=    1  time= 0:03
  55  it =     2  nf =       3  nj =     2  F = 0.4D-10  inf=    1  time= 0:01
  56  it =     3  nf =       4  nj =     3  F = 0.9D-11  inf=    1  time= 0:01
  57  it =     4  nf =       5  nj =     4  F = 0.1D-12  inf=    1  time= 0:02
  58          deleted from this test (invalid operation supposed)
  59  it =     4  nf =       5  nj =     4  F = 0.6D-14  inf=    1  time= 0:03
  60          deleted from this test (invalid operation supposed)
  61          deleted from this test (invalid operation supposed)
  62  it =    10  nf =      38  nj =    10  F = 0.0D+00  inf=    1  time= 0:04
  63  it =    11  nf =      12  nj =    11  F = 0.6D-10  inf=    1  time= 0:09
  64  it =     3  nf =       4  nj =     3  F = 0.4D-15  inf=    1  time= 0:03
-------------------------------------------------------------------------------
Total  it =  1022  nf =    8101  nj =  1022       succesful =  40    time= 7:40
```

```
Test for subroutine nl_huangd_d:    100  variables
------------------------------------------------------------------------------
   1  it =    30  nf =    3351  nj =     0  F = 0.4D+00  inf= 1000  time= 0:01
   2  it =     6  nf =     613  nj =     0  F = 0.4D-11  inf=    1  time= 0:00
   3  it =     3  nf =     307  nj =     0  F = 0.5D-09  inf=    1  time= 0:01
   4  it =    17  nf =    1856  nj =     0  F = 0.4D-09  inf=    1  time= 0:00
   5          failed due to invalid operation
   6  it =    22  nf =    2245  nj =     0  F = 0.9D-08  inf=    1  time= 0:01
   7  it =    21  nf =    2348  nj =     0  F = 0.1D+05  inf= 1000  time= 0:01
   8  it =    90  nf =    9860  nj =     0  F = 0.3D+01  inf= 1000  time= 0:05
   9  it =    98  nf =   10775  nj =     0  F = 0.3D+01  inf= 1000  time= 0:05
  10  it =     6  nf =     613  nj =     0  F = 0.2D-08  inf=    1  time= 0:00
  11  it =    11  nf =    1123  nj =     0  F = 0.8D-11  inf=    1  time= 0:00
  12  it =    36  nf =    3673  nj =     0  F = 0.9D-08  inf=    1  time= 0:02
  13  it =    22  nf =    2245  nj =     0  F = 0.6D-08  inf=    1  time= 0:01
  14  it =    21  nf =    2344  nj =     0  F = 0.1D+01  inf= 1000  time= 0:01
  15  it =     5  nf =     511  nj =     0  F = 0.6D-09  inf=    1  time= 0:00
  16  it =   231  nf =   25440  nj =     0  F = 0.8D-04  inf= 1000  time= 0:11
  17  it =   102  nf =   11242  nj =     0  F = 0.4D+00  inf= 1000  time= 0:05
  18  it =    86  nf =    9579  nj =     0  F = 0.1D+01  inf= 1000  time= 0:05
  19  it =     2  nf =     205  nj =     0  F = 0.3D-08  inf=    1  time= 0:00
  20  it =    29  nf =    3193  nj =     0  F = 0.1D+02  inf= 1000  time= 0:01
  21  it =    17  nf =    1735  nj =     0  F = 0.1D-07  inf=    1  time= 0:01
  22  it =    26  nf =    2889  nj =     0  F = 0.4D+01  inf= 1000  time= 0:01
  23  it =    26  nf =    2864  nj =     0  F = 0.4D+00  inf= 1000  time= 0:01
  24  it =    48  nf =    5290  nj =     0  F = 0.3D-03  inf= 1000  time= 0:03
  25  it =     4  nf =     409  nj =     0  F = 0.8D-11  inf=    1  time= 0:00
  26  it =     9  nf =     919  nj =     0  F = 0.3D-11  inf=    1  time= 0:01
  27  it =    19  nf =    1939  nj =     0  F = 0.1D-11  inf=    1  time= 0:01
  28  it =    20  nf =    2241  nj =     0  F = 0.1D+01  inf= 1000  time= 0:01
  29  it =     4  nf =     409  nj =     0  F = 0.4D-14  inf=    1  time= 0:00
  30  it =    28  nf =    3117  nj =     0  F = 0.3D+00  inf= 1000  time= 0:02
  31  it =    20  nf =    2241  nj =     0  F = 0.5D+05  inf= 1000  time= 0:01
  32          failed due to invalid operation
  33  it =   171  nf =   17444  nj =     0  F = 0.5D-08  inf=    1  time= 0:07
  34  it =     4  nf =     409  nj =     0  F = 0.2D-08  inf=    1  time= 0:00
  35  it =     4  nf =     409  nj =     0  F = 0.3D-10  inf=    1  time= 0:01
  36  it =     1  nf =     103  nj =     0  F = 0.3D-09  inf=    1  time= 0:00
  37  it =     4  nf =     409  nj =     0  F = 0.6D-11  inf=    1  time= 0:00
  38  it =     2  nf =     205  nj =     0  F = 0.5D-09  inf=    1  time= 0:00
  39  it =    47  nf =    5239  nj =     0  F = 0.1D+01  inf=   10  time= 0:02
  40  it =     4  nf =     409  nj =     0  F = 0.2D-11  inf=    1  time= 0:00
  41          failed due to invalid operation
  42  it =     1  nf =     103  nj =     0  F = 0.7D-10  inf=    1  time= 0:01
  43  it =     3  nf =     307  nj =     0  F = 0.3D-09  inf=    1  time= 0:00
  44  it =     5  nf =     511  nj =     0  F = 0.7D-08  inf=    1  time= 0:00
  45  it =     3  nf =     307  nj =     0  F = 0.8D-15  inf=    1  time= 0:00
  46  it =    23  nf =    2561  nj =     0  F = 0.3D-02  inf= 1000  time= 0:06
  47  it =    70  nf =    7824  nj =     0  F = 0.7D+06  inf= 1000  time= 0:05
  48  it =     5  nf =     511  nj =     0  F = 0.3D-13  inf=    1  time= 0:00
  49  it =     3  nf =     307  nj =     0  F = 0.9D-10  inf=    1  time= 0:04
  50  it =     3  nf =     307  nj =     0  F = 0.3D-13  inf=    1  time= 0:00
  51  it =    17  nf =    1735  nj =     0  F = 0.1D-07  inf=    1  time= 0:01
  52  it =     4  nf =     409  nj =     0  F = 0.2D-08  inf=    1  time= 0:00
  53  it =     4  nf =     409  nj =     0  F = 0.1D-13  inf=    1  time= 0:01
  54  it =    23  nf =    2553  nj =     0  F = 0.5D+01  inf= 1000  time= 0:01
  55  it =     2  nf =     205  nj =     0  F = 0.5D-08  inf=    1  time= 0:00
  56  it =     4  nf =     409  nj =     0  F = 0.3D-13  inf=    1  time= 0:01
  57  it =     6  nf =     613  nj =     0  F = 0.3D-13  inf=    1  time= 0:00
  58          failed due to invalid operation
  59  it =     4  nf =     409  nj =     0  F = 0.4D-10  inf=    1  time= 0:01
  60  it =   169  nf =   18721  nj =     0  F = 0.2D+01  inf= 1000  time= 0:08
  61  it =    31  nf =    3456  nj =     0  F = 0.9D+00  inf= 1000  time= 0:14
  62  it =    12  nf =    1255  nj =     0  F = 0.7D-10  inf=    1  time= 0:01
  63  it =     4  nf =     409  nj =     0  F = 0.3D-10  inf=    1  time= 0:00
  64  it =     3  nf =     307  nj =     0  F = 0.8D-15  inf=    1  time= 0:01
------------------------------------------------------------------------------
Total  it =  1695  nf =  183831  nj =     0      succesful =  39    time= 1:47
```

```
Test for subroutine nl_huangd_d:    200  variables
-------------------------------------------------------------------------------
    1  it =    30  nf =    6351  nj =     0  F = 0.2D+01  inf= 1000  time= 0:11
    2  it =    10  nf =    2034  nj =     0  F = 0.3D-10  inf=    1  time= 0:04
    3  it =     3  nf =     607  nj =     0  F = 0.3D-09  inf=    1  time= 0:01
    4  it =    17  nf =    3556  nj =     0  F = 0.4D-09  inf=    1  time= 0:07
    5           failed due to invalid operation
    6  it =    22  nf =    4445  nj =     0  F = 0.9D-08  inf=    1  time= 0:07
    7  it =    21  nf =    4448  nj =     0  F = 0.1D+05  inf= 1000  time= 0:08
    8  it =    30  nf =    6306  nj =     0  F = 0.1D+02  inf= 1000  time= 0:10
    9  it =    52  nf =   10851  nj =     0  F = 0.3D+01  inf= 1000  time= 0:19
   10  it =     6  nf =    1213  nj =     0  F = 0.9D-08  inf=    1  time= 0:02
   11  it =    11  nf =    2223  nj =     0  F = 0.8D-11  inf=    1  time= 0:04
   12  it =    36  nf =    7273  nj =     0  F = 0.9D-08  inf=    1  time= 0:12
   13  it =    22  nf =    4445  nj =     0  F = 0.6D-08  inf=    1  time= 0:08
   14  it =    21  nf =    4444  nj =     0  F = 0.1D+01  inf= 1000  time= 0:07
   15  it =     5  nf =    1011  nj =     0  F = 0.6D-09  inf=    1  time= 0:02
   16  it =   231  nf =   48540  nj =     0  F = 0.8D-04  inf= 1000  time= 1:20
   17  it =   102  nf =   21442  nj =     0  F = 0.4D+00  inf= 1000  time= 0:34
   18  it =   112  nf =   23706  nj =     0  F = 0.1D+01  inf= 1000  time= 0:44
   19  it =     3  nf =     607  nj =     0  F = 0.8D-11  inf=    1  time= 0:01
   20  it =    51  nf =   10769  nj =     0  F = 0.3D+02  inf= 1000  time= 0:18
   21  it =    19  nf =    3839  nj =     0  F = 0.2D-11  inf=    1  time= 0:07
   22  it =    21  nf =    4444  nj =     0  F = 0.2D+01  inf= 1000  time= 0:08
   23  it =    50  nf =   10470  nj =     0  F = 0.2D+00  inf= 1000  time= 0:19
   24  it =     9  nf =    1783  nj =     0  F = 0.3D-09  inf=    1  time= 0:03
   25  it =     4  nf =     793  nj =     0  F = 0.2D-09  inf=    1  time= 0:02
   26  it =     9  nf =    1784  nj =     0  F = 0.3D-10  inf=    1  time= 0:03
   27  it =    24  nf =    4753  nj =     0  F = 0.2D-11  inf=    1  time= 0:09
   28  it =    24  nf =    4977  nj =     0  F = 0.5D+00  inf= 1000  time= 0:09
   29  it =     4  nf =     793  nj =     0  F = 0.4D-09  inf=    1  time= 0:01
   30  it =    20  nf =    4161  nj =     0  F = 0.3D+00  inf= 1000  time= 0:08
   31  it =    20  nf =    4241  nj =     0  F = 0.2D+05  inf= 1000  time= 0:08
   32           failed due to invalid operation
   33  it =   298  nf =   60197  nj =     0  F = 0.8D-08  inf=    1  time= 1:41
   34  it =     4  nf =     809  nj =     0  F = 0.2D-08  inf=    1  time= 0:01
   35  it =     4  nf =     809  nj =     0  F = 0.1D-09  inf=    1  time= 0:02
   36  it =     1  nf =     203  nj =     0  F = 0.3D-09  inf=    1  time= 0:00
   37  it =     4  nf =     809  nj =     0  F = 0.5D-11  inf=    1  time= 0:02
   38  it =     2  nf =     405  nj =     0  F = 0.2D-08  inf=    1  time= 0:01
   39  it =    21  nf =    4445  nj =     0  F = 0.1D+01  inf= 1000  time= 0:07
   40  it =     4  nf =     809  nj =     0  F = 0.2D-11  inf=    1  time= 0:02
   41           failed due to invalid operation
   42  it =     1  nf =     203  nj =     0  F = 0.7D-10  inf=    1  time= 0:00
   43  it =     3  nf =     607  nj =     0  F = 0.1D-08  inf=    1  time= 0:01
   44  it =     5  nf =    1011  nj =     0  F = 0.7D-08  inf=    1  time= 0:02
   45  it =     3  nf =     607  nj =     0  F = 0.8D-15  inf=    1  time= 0:02
   46  it =    41  nf =    8552  nj =     0  F = 0.5D-03  inf= 1000  time= 1:24
   47  it =    81  nf =   17160  nj =     0  F = 0.4D+06  inf= 1000  time= 0:43
   48  it =     5  nf =    1011  nj =     0  F = 0.3D-13  inf=    1  time= 0:02
   49  it =     4  nf =     809  nj =     0  F = 0.2D-09  inf=    1  time= 0:35
   50  it =     3  nf =     607  nj =     0  F = 0.7D-13  inf=    1  time= 0:04
   51  it =    19  nf =    3839  nj =     0  F = 0.2D-11  inf=    1  time= 0:07
   52  it =     5  nf =    1011  nj =     0  F = 0.3D-11  inf=    1  time= 0:02
   53  it =     4  nf =     809  nj =     0  F = 0.1D-13  inf=    1  time= 0:06
   54  it =    26  nf =    5469  nj =     0  F = 0.1D+01  inf= 1000  time= 0:10
   55  it =     2  nf =     405  nj =     0  F = 0.3D-08  inf=    1  time= 0:01
   56  it =     4  nf =     809  nj =     0  F = 0.1D-12  inf=    1  time= 0:01
   57  it =     6  nf =    1213  nj =     0  F = 0.4D-09  inf=    1  time= 0:03
   58           failed due to invalid operation
   59  it =     4  nf =     809  nj =     0  F = 0.4D-10  inf=    1  time= 0:04
   60  it =   157  nf =   33051  nj =     0  F = 0.3D+01  inf= 1000  time= 0:56
   61  it =    24  nf =    5084  nj =     0  F = 0.1D+01  inf= 1000  time= 1:40
   62  it =    12  nf =    2455  nj =     0  F = 0.7D-10  inf=    1  time= 0:04
   63  it =     4  nf =     809  nj =     0  F = 0.1D-10  inf=    1  time= 0:02
   64  it =     3  nf =     607  nj =     0  F = 0.8D-15  inf=    1  time= 0:03
-------------------------------------------------------------------------------
Total  it =  1743  nf =  361732  nj =     0       succesful =  40    time=14:04
```

```
Test for subroutine nl_ilud_d:    100  variables
-------------------------------------------------------------------------------
    1  it =    32  nf =    2016  nj =     0  F = 0.2D+01  inf= 1000  time= 0:01
    2  it =    25  nf =    1552  nj =     0  F = 0.9D+00  inf= 1000  time= 0:00
    3  it =     3  nf =     160  nj =     0  F = 0.4D-09  inf=    1  time= 0:00
    4  it =    18  nf =    1085  nj =     0  F = 0.9D-12  inf=    1  time= 0:01
    5          failed due to invalid operation
    6  it =    17  nf =     902  nj =     0  F = 0.4D-08  inf=    1  time= 0:00
    7  it =    72  nf =    4396  nj =     0  F = 0.2D+01  inf= 1000  time= 0:02
    8  it =   125  nf =    7648  nj =     0  F = 0.2D+01  inf= 1000  time= 0:02
    9  it =   108  nf =    6698  nj =     0  F = 0.3D+01  inf= 1000  time= 0:03
   10  it =     5  nf =     266  nj =     0  F = 0.3D-12  inf=    1  time= 0:00
   11  it =    23  nf =    1460  nj =     0  F = 0.2D+06  inf= 1000  time= 0:01
   12  it =    22  nf =    1372  nj =     0  F = 0.6D+01  inf= 1000  time= 0:00
   13  it =    18  nf =     966  nj =     0  F = 0.4D-08  inf=    1  time= 0:00
   14  it =     4  nf =     213  nj =     0  F = 0.6D-11  inf=    1  time= 0:01
   15  it =     5  nf =     266  nj =     0  F = 0.3D-09  inf=    1  time= 0:00
   16  it =    24  nf =    1476  nj =     0  F = 0.3D-01  inf= 1000  time= 0:00
   17  it =    63  nf =    3825  nj =     0  F = 0.2D+00  inf= 1000  time= 0:01
   18  it =    90  nf =    5610  nj =     0  F = 0.1D+01  inf= 1000  time= 0:03
   19  it =     2  nf =     107  nj =     0  F = 0.1D-08  inf=    1  time= 0:00
   20  it =    26  nf =    1598  nj =     0  F = 0.1D+03  inf= 1000  time= 0:00
   21  it =    12  nf =     637  nj =     0  F = 0.3D-08  inf=    1  time= 0:01
   22  it =    26  nf =    1639  nj =     0  F = 0.5D+01  inf= 1000  time= 0:00
   23  it =    49  nf =    3072  nj =     0  F = 0.1D+01  inf= 1000  time= 0:02
   24  it =    26  nf =    1589  nj =     0  F = 0.3D-03  inf= 1000  time= 0:00
   25  it =     4  nf =     213  nj =     0  F = 0.3D-12  inf=    1  time= 0:00
   26  it =     8  nf =     426  nj =     0  F = 0.5D-11  inf=    1  time= 0:01
   27  it =    10  nf =     531  nj =     0  F = 0.6D-11  inf=    1  time= 0:00
   28  it =    23  nf =    1450  nj =     0  F = 0.1D+01  inf= 1000  time= 0:00
   29  it =     3  nf =     160  nj =     0  F = 0.7D-10  inf=    1  time= 0:00
   30  it =    26  nf =    1594  nj =     0  F = 0.2D+00  inf= 1000  time= 0:01
   31  it =    15  nf =     816  nj =     0  F = 0.1D-08  inf=    1  time= 0:00
   32          failed due to invalid operation
   33  it =   170  nf =    9011  nj =     0  F = 0.6D-08  inf=    1  time= 0:04
   34  it =     4  nf =     213  nj =     0  F = 0.2D-08  inf=    1  time= 0:00
   35  it =     9  nf =     478  nj =     0  F = 0.9D-10  inf=    1  time= 0:00
   36  it =     2  nf =     107  nj =     0  F = 0.2D-11  inf=    1  time= 0:01
   37  it =    33  nf =    2062  nj =     0  F = 0.6D+00  inf= 1000  time= 0:01
   38  it =     2  nf =     107  nj =     0  F = 0.6D-09  inf=    1  time= 0:00
   39  it =     4  nf =     214  nj =     0  F = 0.9D-08  inf=    1  time= 0:01
   40  it =     4  nf =     213  nj =     0  F = 0.7D-12  inf=    1  time= 0:00
   41          failed due to invalid operation
   42  it =     2  nf =     107  nj =     0  F = 0.5D-12  inf=    1  time= 0:00
   43  it =     3  nf =     160  nj =     0  F = 0.1D-10  inf=    1  time= 0:00
   44  it =     5  nf =     266  nj =     0  F = 0.7D-08  inf=    1  time= 0:00
   45  it =     3  nf =     160  nj =     0  F = 0.3D-13  inf=    1  time= 0:00
   46  it =     5  nf =     269  nj =     0  F = 0.2D-09  inf=    1  time= 0:01
   47  it =    25  nf =    1570  nj =     0  F = 0.6D+12  inf= 1000  time= 0:01
   48  it =     4  nf =     213  nj =     0  F = 0.8D-09  inf=    1  time= 0:00
   49  it =     3  nf =     160  nj =     0  F = 0.2D-09  inf=    1  time= 0:02
   50  it =     3  nf =     160  nj =     0  F = 0.4D-12  inf=    1  time= 0:00
   51  it =    12  nf =     637  nj =     0  F = 0.3D-08  inf=    1  time= 0:00
   52  it =    23  nf =    1439  nj =     0  F = 0.2D-03  inf= 1000  time= 0:01
   53  it =     3  nf =     160  nj =     0  F = 0.2D-08  inf=    1  time= 0:00
   54  it =     6  nf =     326  nj =     0  F = 0.2D-09  inf=    1  time= 0:00
   55  it =     2  nf =     107  nj =     0  F = 0.2D-08  inf=    1  time= 0:00
   56  it =     3  nf =     160  nj =     0  F = 0.3D-09  inf=    1  time= 0:00
   57  it =     4  nf =     213  nj =     0  F = 0.3D-11  inf=    1  time= 0:01
   58          failed due to invalid operation
   59  it =     4  nf =     213  nj =     0  F = 0.3D-12  inf=    1  time= 0:00
   60  it =    72  nf =    4373  nj =     0  F = 0.3D+01  inf= 1000  time= 0:01
   61  it =    28  nf =    2571  nj =     0  F = 0.1D+01  inf= 1000  time= 0:11
   62  it =    11  nf =     611  nj =     0  F = 0.7D-11  inf=    1  time= 0:00
   63  it =     9  nf =     478  nj =     0  F = 0.9D-10  inf=    1  time= 0:01
   64  it =     3  nf =     160  nj =     0  F = 0.3D-13  inf=    1  time= 0:00
-------------------------------------------------------------------------------
Total  it =  1345  nf =   80661  nj =     0      succesful =  39     time= 0:46
```

```
Test for subroutine nl_ilud_d:    200  variables
-------------------------------------------------------------------------------
    1  it =    34  nf =    3843  nj =     0  F = 0.2D+01  inf= 1000  time= 0:05
    2  it =    63  nf =    7044  nj =     0  F = 0.7D+00  inf= 1000  time= 0:10
    3  it =     3  nf =     310  nj =     0  F = 0.3D-09  inf=    1  time= 0:00
    4  it =    18  nf =    1985  nj =     0  F = 0.9D-12  inf=    1  time= 0:03
    5          failed due to invalid operation
    6  it =    17  nf =    1752  nj =     0  F = 0.4D-08  inf=    1  time= 0:03
    7  it =    72  nf =    7996  nj =     0  F = 0.2D+01  inf= 1000  time= 0:11
    8  it =   158  nf =   17668  nj =     0  F = 0.3D+01  inf= 1000  time= 0:24
    9  it =   124  nf =   13928  nj =     0  F = 0.3D+01  inf= 1000  time= 0:19
   10  it =     5  nf =     516  nj =     0  F = 0.3D-12  inf=    1  time= 0:01
   11  it =    23  nf =    2610  nj =     0  F = 0.2D+06  inf= 1000  time= 0:03
   12  it =    22  nf =    2472  nj =     0  F = 0.6D+01  inf= 1000  time= 0:04
   13  it =    18  nf =    1866  nj =     0  F = 0.4D-08  inf=    1  time= 0:02
   14  it =     4  nf =     413  nj =     0  F = 0.6D-11  inf=    1  time= 0:01
   15  it =     5  nf =     516  nj =     0  F = 0.3D-09  inf=    1  time= 0:01
   16  it =    24  nf =    2676  nj =     0  F = 0.3D-01  inf= 1000  time= 0:03
   17  it =    63  nf =    6975  nj =     0  F = 0.2D+00  inf= 1000  time= 0:09
   18  it =    51  nf =    5737  nj =     0  F = 0.1D+01  inf= 1000  time= 0:09
   19  it =     2  nf =     207  nj =     0  F = 0.7D-09  inf=    1  time= 0:00
   20  it =    38  nf =    4219  nj =     0  F = 0.3D+02  inf= 1000  time= 0:06
   21  it =    12  nf =    1237  nj =     0  F = 0.9D-09  inf=    1  time= 0:02
   22  it =    30  nf =    3393  nj =     0  F = 0.4D+01  inf= 1000  time= 0:04
   23  it =    47  nf =    5302  nj =     0  F = 0.8D+00  inf= 1000  time= 0:08
   24  it =     8  nf =     809  nj =     0  F = 0.3D-09  inf=    1  time= 0:01
   25  it =     4  nf =     405  nj =     0  F = 0.3D-12  inf=    1  time= 0:01
   26  it =     8  nf =     809  nj =     0  F = 0.2D-10  inf=    1  time= 0:01
   27  it =    11  nf =    1112  nj =     0  F = 0.2D-10  inf=    1  time= 0:02
   28  it =    27  nf =    2998  nj =     0  F = 0.6D+00  inf= 1000  time= 0:04
   29  it =     3  nf =     304  nj =     0  F = 0.2D-09  inf=    1  time= 0:00
   30  it =    24  nf =    2633  nj =     0  F = 0.2D+00  inf= 1000  time= 0:04
   31  it =    15  nf =    1556  nj =     0  F = 0.4D-08  inf=    1  time= 0:02
   32          failed due to invalid operation
   33  it =   294  nf =   30283  nj =     0  F = 0.9D-08  inf=    1  time= 0:44
   34  it =     4  nf =     413  nj =     0  F = 0.2D-08  inf=    1  time= 0:00
   35  it =    10  nf =    1031  nj =     0  F = 0.2D-10  inf=    1  time= 0:02
   36  it =     2  nf =     207  nj =     0  F = 0.2D-11  inf=    1  time= 0:01
   37  it =    21  nf =    2368  nj =     0  F = 0.7D+00  inf= 1000  time= 0:05
   38  it =     2  nf =     207  nj =     0  F = 0.1D-08  inf=    1  time= 0:00
   39  it =     4  nf =     414  nj =     0  F = 0.9D-08  inf=    1  time= 0:01
   40  it =     4  nf =     413  nj =     0  F = 0.7D-12  inf=    1  time= 0:01
   41          failed due to invalid operation
   42  it =     2  nf =     207  nj =     0  F = 0.5D-12  inf=    1  time= 0:00
   43  it =     3  nf =     310  nj =     0  F = 0.4D-10  inf=    1  time= 0:00
   44  it =     5  nf =     516  nj =     0  F = 0.7D-08  inf=    1  time= 0:01
   45  it =     3  nf =     310  nj =     0  F = 0.3D-13  inf=    1  time= 0:01
   46  it =     6  nf =     623  nj =     0  F = 0.6D-11  inf=    1  time= 0:06
   47  it =    30  nf =    3874  nj =     0  F = 0.2D+15  inf= 1000  time= 0:07
   48  it =     4  nf =     413  nj =     0  F = 0.8D-09  inf=    1  time= 0:01
   49  it =     4  nf =     413  nj =     0  F = 0.8D-09  inf=    1  time= 0:18
   50  it =     3  nf =     310  nj =     0  F = 0.4D-12  inf=    1  time= 0:02
   51  it =    12  nf =    1237  nj =     0  F = 0.9D-09  inf=    1  time= 0:02
   52  it =    25  nf =    2816  nj =     0  F = 0.5D-04  inf= 1000  time= 0:04
   53  it =     3  nf =     310  nj =     0  F = 0.2D-08  inf=    1  time= 0:02
   54  it =     6  nf =     627  nj =     0  F = 0.2D-09  inf=    1  time= 0:01
   55  it =     2  nf =     207  nj =     0  F = 0.2D-08  inf=    1  time= 0:00
   56  it =     3  nf =     310  nj =     0  F = 0.2D-09  inf=    1  time= 0:01
   57  it =     4  nf =     413  nj =     0  F = 0.3D-11  inf=    1  time= 0:00
   58          failed due to invalid operation
   59  it =     4  nf =     413  nj =     0  F = 0.2D-12  inf=    1  time= 0:02
   60  it =   149  nf =   16719  nj =     0  F = 0.4D+01  inf= 1000  time= 0:23
   61  it =    25  nf =    4796  nj =     0  F = 0.1D+01  inf= 1000  time= 1:34
   62  it =    11  nf =    1161  nj =     0  F = 0.7D-11  inf=    1  time= 0:01
   63  it =    10  nf =    1031  nj =     0  F = 0.2D-10  inf=    1  time= 0:02
   64  it =     3  nf =     310  nj =     0  F = 0.3D-13  inf=    1  time= 0:02
-------------------------------------------------------------------------------
Total  it =  1591  nf =  175953  nj =     0      succesful =  40     time= 6:07
```

```
Test for subroutine nl_ilud_d:    500  variables
------------------------------------------------------------------------------
    1  it =    22  nf =    5787  nj =     0  F = 0.2D+01  inf= 1000  time= 0:50
    2  it =    44  nf =   11536  nj =     0  F = 0.1D+01  inf= 1000  time= 1:37
    3  it =     3  nf =     760  nj =     0  F = 0.2D-09  inf=    1  time= 0:08
    4  it =    18  nf =    4685  nj =     0  F = 0.9D-12  inf=    1  time= 0:42
    5          deleted from this test (invalid operation supposed)
    6  it =    17  nf =    4302  nj =     0  F = 0.4D-08  inf=    1  time= 0:37
    7  it =    72  nf =   18796  nj =     0  F = 0.2D+01  inf= 1000  time= 2:40
    8  it =    60  nf =   15740  nj =     0  F = 0.5D+01  inf= 1000  time= 2:14
    9  it =   108  nf =   28335  nj =     0  F = 0.3D+01  inf= 1000  time= 4:01
   10  it =     5  nf =    1266  nj =     0  F = 0.3D-12  inf=    1  time= 0:12
   11  it =    23  nf =    6060  nj =     0  F = 0.2D+06  inf= 1000  time= 0:52
   12  it =    22  nf =    5772  nj =     0  F = 0.6D+01  inf= 1000  time= 0:49
   13  it =    18  nf =    4566  nj =     0  F = 0.4D-08  inf=    1  time= 0:41
   14  it =     4  nf =    1013  nj =     0  F = 0.6D-11  inf=    1  time= 0:09
   15  it =     5  nf =    1266  nj =     0  F = 0.3D-09  inf=    1  time= 0:11
   16  it =    24  nf =    6276  nj =     0  F = 0.3D-01  inf= 1000  time= 0:54
   17  it =    63  nf =   16425  nj =     0  F = 0.2D+00  inf= 1000  time= 2:19
   18  it =    68  nf =   17873  nj =     0  F = 0.1D+01  inf= 1000  time= 2:38
   19  it =     2  nf =     507  nj =     0  F = 0.7D-09  inf=    1  time= 0:04
   20  it =    31  nf =    8108  nj =     0  F = 0.2D+03  inf= 1000  time= 1:09
   21  it =    12  nf =    3037  nj =     0  F = 0.6D-09  inf=    1  time= 0:27
   22  it =    34  nf =    8943  nj =     0  F = 0.3D+01  inf= 1000  time= 1:16
   23  it =    59  nf =   15509  nj =     0  F = 0.7D+00  inf= 1000  time= 2:22
   24  it =     7  nf =    1716  nj =     0  F = 0.6D-09  inf=    1  time= 0:15
   25  it =     3  nf =     736  nj =     0  F = 0.1D-07  inf=    1  time= 0:06
   26  it =     7  nf =    1716  nj =     0  F = 0.3D-11  inf=    1  time= 0:16
   27  it =    13  nf =    3186  nj =     0  F = 0.3D-10  inf=    1  time= 0:27
   28  it =    59  nf =   15046  nj =     0  F = 0.2D+00  inf= 1000  time= 2:04
   29  it =     3  nf =     736  nj =     0  F = 0.5D-08  inf=    1  time= 0:06
   30  it =    23  nf =    5841  nj =     0  F = 0.1D+00  inf= 1000  time= 0:51
   31  it =    15  nf =    3806  nj =     0  F = 0.3D-08  inf=    1  time= 0:34
   32          deleted from this test (invalid operation supposed)
   33          deleted from this test (long time supposed)
   34  it =     4  nf =    1013  nj =     0  F = 0.2D-08  inf=    1  time= 0:09
   35  it =    11  nf =    2784  nj =     0  F = 0.5D-10  inf=    1  time= 0:35
   36  it =     2  nf =     507  nj =     0  F = 0.2D-11  inf=    1  time= 0:05
   37  it =    31  nf =    8149  nj =     0  F = 0.7D+00  inf= 1000  time= 1:49
   38  it =     2  nf =     507  nj =     0  F = 0.3D-08  inf=    1  time= 0:05
   39  it =     4  nf =    1014  nj =     0  F = 0.9D-08  inf=    1  time= 0:09
   40  it =     4  nf =    1013  nj =     0  F = 0.7D-12  inf=    1  time= 0:09
   41          deleted from this test (invalid operation supposed)
   42  it =     2  nf =     507  nj =     0  F = 0.5D-12  inf=    1  time= 0:04
   43  it =     2  nf =     507  nj =     0  F = 0.2D-08  inf=    1  time= 0:05
   44  it =     5  nf =    1266  nj =     0  F = 0.7D-08  inf=    1  time= 0:11
   45  it =     3  nf =     760  nj =     0  F = 0.3D-13  inf=    1  time= 0:13
   46  it =     6  nf =    1528  nj =     0  F = 0.1D-07  inf=    1  time= 1:29
   47  it =    23  nf =   11236  nj =     0  F = 0.9D+14  inf= 1000  time= 2:07
   48  it =     4  nf =    1013  nj =     0  F = 0.8D-09  inf=    1  time= 0:09
   49  it =     4  nf =    1013  nj =     0  F = 0.6D-08  inf=    1  time= 4:34
   50  it =     3  nf =     760  nj =     0  F = 0.5D-12  inf=    1  time= 0:26
   51  it =    12  nf =    3037  nj =     0  F = 0.6D-09  inf=    1  time= 0:27
   52  it =    29  nf =    7618  nj =     0  F = 0.7D-05  inf= 1000  time= 1:06
   53  it =     3  nf =     760  nj =     0  F = 0.2D-08  inf=    1  time= 0:35
   54  it =     6  nf =    1527  nj =     0  F = 0.7D-08  inf=    1  time= 0:14
   55  it =     2  nf =     507  nj =     0  F = 0.7D-09  inf=    1  time= 0:04
   56  it =     3  nf =     760  nj =     0  F = 0.2D-09  inf=    1  time= 0:08
   57  it =     4  nf =    1013  nj =     0  F = 0.3D-11  inf=    1  time= 0:09
   58          deleted from this test (invalid operation supposed)
   59  it =     4  nf =    1013  nj =     0  F = 0.2D-12  inf=    1  time= 0:29
   60  it =    64  nf =   16811  nj =     0  F = 0.1D+02  inf= 1000  time= 2:23
   61          deleted from this test (long time supposed)
   62  it =    11  nf =    2811  nj =     0  F = 0.7D-11  inf=    1  time= 0:25
   63  it =    11  nf =    2784  nj =     0  F = 0.5D-10  inf=    1  time= 0:35
   64  it =     3  nf =     760  nj =     0  F = 0.3D-13  inf=    1  time= 0:21
------------------------------------------------------------------------------
Total  it =  1106  nf =  292323  nj=     0       succesful =  39     time=50:46
```

```
Test for subroutine nl_ilud_dt:    100  variables
-------------------------------------------------------------------------------
    1  it =    32  nf =    2113  nj =     0  F = 0.2D+01  inf= 1000  time= 0:01
    2  it =    25  nf =    1602  nj =     0  F = 0.9D+00  inf= 1000  time= 0:00
    3  it =     3  nf =     172  nj =     0  F = 0.4D-09  inf=    1  time= 0:01
    4  it =    18  nf =    1124  nj =     0  F = 0.9D-12  inf=    1  time= 0:00
    5          failed due to invalid operation
    6  it =    17  nf =     936  nj =     0  F = 0.4D-08  inf=    1  time= 0:00
    7  it =    72  nf =    4540  nj =     0  F = 0.2D+01  inf= 1000  time= 0:02
    8  it =   125  nf =    7898  nj =     0  F = 0.2D+01  inf= 1000  time= 0:03
    9  it =   108  nf =    7098  nj =     0  F = 0.3D+01  inf= 1000  time= 0:03
   10  it =     5  nf =     276  nj =     0  F = 0.3D-12  inf=    1  time= 0:00
   11  it =    23  nf =    2288  nj =     0  F = 0.2D+06  inf= 1000  time= 0:00
   12  it =    22  nf =    1416  nj =     0  F = 0.6D+01  inf= 1000  time= 0:01
   13  it =    18  nf =    1003  nj =     0  F = 0.4D-08  inf=    1  time= 0:00
   14  it =     4  nf =     221  nj =     0  F = 0.6D-11  inf=    1  time= 0:00
   15  it =     5  nf =     309  nj =     0  F = 0.3D-09  inf=    1  time= 0:00
   16  it =    24  nf =    1524  nj =     0  F = 0.3D-01  inf= 1000  time= 0:01
   17  it =    63  nf =    3951  nj =     0  F = 0.2D+00  inf= 1000  time= 0:01
   18  it =    90  nf =    5790  nj =     0  F = 0.1D+01  inf= 1000  time= 0:03
   19  it =     2  nf =     111  nj =     0  F = 0.1D-08  inf=    1  time= 0:00
   20  it =    26  nf =    1771  nj =     0  F = 0.1D+03  inf= 1000  time= 0:01
   21  it =    12  nf =     662  nj =     0  F = 0.3D-08  inf=    1  time= 0:00
   22  it =    26  nf =    1775  nj =     0  F = 0.5D+01  inf= 1000  time= 0:01
   23  it =    49  nf =    3305  nj =     0  F = 0.1D+01  inf= 1000  time= 0:01
   24  it =    26  nf =    1697  nj =     0  F = 0.3D-03  inf= 1000  time= 0:00
   25  it =     4  nf =     221  nj =     0  F = 0.3D-12  inf=    1  time= 0:01
   26  it =     8  nf =     449  nj =     0  F = 0.5D-11  inf=    1  time= 0:00
   27  it =    10  nf =     645  nj =     0  F = 0.6D-11  inf=    1  time= 0:00
   28  it =    23  nf =    1496  nj =     0  F = 0.1D+01  inf= 1000  time= 0:01
   29  it =     3  nf =     166  nj =     0  F = 0.7D-10  inf=    1  time= 0:00
   30  it =    26  nf =    1892  nj =     0  F = 0.2D+00  inf= 1000  time= 0:00
   31  it =    15  nf =     893  nj =     0  F = 0.1D-08  inf=    1  time= 0:01
   32          failed due to invalid operation
   33  it =   170  nf =   13814  nj =     0  F = 0.6D-08  inf=    1  time= 0:04
   34  it =     4  nf =     221  nj =     0  F = 0.2D-08  inf=    1  time= 0:00
   35  it =     9  nf =     929  nj =     0  F = 0.9D-10  inf=    1  time= 0:00
   36  it =     2  nf =     111  nj =     0  F = 0.2D-11  inf=    1  time= 0:00
   37  it =    33  nf =    2261  nj =     0  F = 0.6D+00  inf= 1000  time= 0:01
   38  it =     2  nf =     111  nj =     0  F = 0.6D-09  inf=    1  time= 0:00
   39  it =     4  nf =     267  nj =     0  F = 0.9D-08  inf=    1  time= 0:00
   40  it =     4  nf =     254  nj =     0  F = 0.7D-12  inf=    1  time= 0:01
   41          failed due to invalid operation
   42  it =     2  nf =     111  nj =     0  F = 0.5D-12  inf=    1  time= 0:00
   43  it =     3  nf =     170  nj =     0  F = 0.1D-10  inf=    1  time= 0:00
   44  it =     5  nf =     320  nj =     0  F = 0.7D-08  inf=    1  time= 0:00
   45  it =     3  nf =     185  nj =     0  F = 0.3D-13  inf=    1  time= 0:00
   46  it =     5  nf =     281  nj =     0  F = 0.2D-09  inf=    1  time= 0:01
   47  it =    25  nf =    1652  nj =     0  F = 0.6D+12  inf= 1000  time= 0:00
   48  it =     4  nf =     221  nj =     0  F = 0.8D-09  inf=    1  time= 0:01
   49  it =     3  nf =     168  nj =     0  F = 0.2D-09  inf=    1  time= 0:01
   50  it =     3  nf =     167  nj =     0  F = 0.4D-12  inf=    1  time= 0:01
   51  it =    12  nf =     662  nj =     0  F = 0.3D-08  inf=    1  time= 0:00
   52  it =    23  nf =    1496  nj =     0  F = 0.2D-03  inf= 1000  time= 0:01
   53  it =     3  nf =     173  nj =     0  F = 0.2D-08  inf=    1  time= 0:00
   54  it =     6  nf =     621  nj =     0  F = 0.2D-09  inf=    1  time= 0:00
   55  it =     2  nf =     111  nj =     0  F = 0.2D-08  inf=    1  time= 0:00
   56  it =     3  nf =     166  nj =     0  F = 0.3D-09  inf=    1  time= 0:00
   57  it =     4  nf =     221  nj =     0  F = 0.3D-11  inf=    1  time= 0:00
   58          failed due to invalid operation
   59  it =     4  nf =     221  nj =     0  F = 0.3D-12  inf=    1  time= 0:01
   60  it =    72  nf =    4648  nj =     0  F = 0.3D+01  inf= 1000  time= 0:01
   61  it =    28  nf =    2922  nj =     0  F = 0.1D+01  inf= 1000  time= 0:12
   62  it =    11  nf =     633  nj =     0  F = 0.7D-11  inf=    1  time= 0:01
   63  it =     9  nf =     929  nj =     0  F = 0.9D-10  inf=    1  time= 0:00
   64  it =     3  nf =     185  nj =     0  F = 0.3D-13  inf=    1  time= 0:00
-------------------------------------------------------------------------------
Total  it =  1345  nf =   91575  nj =     0       succesful =  39    time= 0:48
```

```
Test for subroutine nl_ilud_dt:    200  variables
------------------------------------------------------------------------------
   1  it =    34  nf =     4184  nj =     0  F = 0.2D+01  inf= 1000  time= 0:06
   2  it =    63  nf =     7535  nj =     0  F = 0.7D+00  inf= 1000  time= 0:11
   3  it =     3  nf =      327  nj =     0  F = 0.3D-09  inf=    1  time= 0:01
   4  it =    18  nf =     2023  nj =     0  F = 0.9D-12  inf=    1  time= 0:03
   5           failed due to invalid operation
   6  it =    17  nf =     1786  nj =     0  F = 0.4D-08  inf=    1  time= 0:02
   7  it =    72  nf =     8140  nj =     0  F = 0.2D+01  inf= 1000  time= 0:12
   8  it =   158  nf =    18007  nj =     0  F = 0.3D+01  inf= 1000  time= 0:24
   9  it =   124  nf =    14886  nj =     0  F = 0.3D+01  inf= 1000  time= 0:20
  10  it =     5  nf =      526  nj =     0  F = 0.3D-12  inf=    1  time= 0:01
  11  it =    23  nf =     4286  nj =     0  F = 0.2D+06  inf= 1000  time= 0:04
  12  it =    22  nf =     2516  nj =     0  F = 0.6D+01  inf= 1000  time= 0:03
  13  it =    18  nf =     1903  nj =     0  F = 0.4D-08  inf=    1  time= 0:03
  14  it =     4  nf =      421  nj =     0  F = 0.6D-11  inf=    1  time= 0:00
  15  it =     5  nf =      608  nj =     0  F = 0.3D-09  inf=    1  time= 0:01
  16  it =    24  nf =     2724  nj =     0  F = 0.3D-01  inf= 1000  time= 0:04
  17  it =    63  nf =     7101  nj =     0  F = 0.2D+00  inf= 1000  time= 0:10
  18  it =    51  nf =     5839  nj =     0  F = 0.1D+01  inf= 1000  time= 0:08
  19  it =     2  nf =      211  nj =     0  F = 0.7D-09  inf=    1  time= 0:01
  20  it =    38  nf =     4795  nj =     0  F = 0.3D+02  inf= 1000  time= 0:06
  21  it =    12  nf =     1262  nj =     0  F = 0.9D-09  inf=    1  time= 0:02
  22  it =    30  nf =     4004  nj =     0  F = 0.4D+01  inf= 1000  time= 0:04
  23  it =    47  nf =     6759  nj =     0  F = 0.8D+00  inf= 1000  time= 0:09
  24  it =     8  nf =      831  nj =     0  F = 0.3D-09  inf=    1  time= 0:01
  25  it =     4  nf =      413  nj =     0  F = 0.3D-12  inf=    1  time= 0:01
  26  it =     8  nf =      832  nj =     0  F = 0.2D-10  inf=    1  time= 0:01
  27  it =    11  nf =     1334  nj =     0  F = 0.2D-10  inf=    1  time= 0:02
  28  it =    27  nf =     3052  nj =     0  F = 0.6D+00  inf= 1000  time= 0:04
  29  it =     3  nf =      310  nj =     0  F = 0.2D-09  inf=    1  time= 0:01
  30  it =    24  nf =     3533  nj =     0  F = 0.2D+00  inf= 1000  time= 0:04
  31  it =    15  nf =     1677  nj =     0  F = 0.4D-08  inf=    1  time= 0:02
  32           failed due to invalid operation
  33  it =   294  nf =    47270  nj =     0  F = 0.9D-08  inf=    1  time= 0:46
  34  it =     4  nf =      421  nj =     0  F = 0.2D-08  inf=    1  time= 0:01
  35  it =    10  nf =     2028  nj =     0  F = 0.2D-10  inf=    1  time= 0:03
  36  it =     2  nf =      212  nj =     0  F = 0.2D-11  inf=    1  time= 0:00
  37  it =    21  nf =     2411  nj =     0  F = 0.7D+00  inf= 1000  time= 0:05
  38  it =     2  nf =      211  nj =     0  F = 0.1D-08  inf=    1  time= 0:00
  39  it =     4  nf =      509  nj =     0  F = 0.9D-08  inf=    1  time= 0:01
  40  it =     4  nf =      497  nj =     0  F = 0.7D-12  inf=    1  time= 0:01
  41           failed due to invalid operation
  42  it =     2  nf =      211  nj =     0  F = 0.5D-12  inf=    1  time= 0:00
  43  it =     3  nf =      335  nj =     0  F = 0.4D-10  inf=    1  time= 0:00
  44  it =     5  nf =      620  nj =     0  F = 0.7D-08  inf=    1  time= 0:01
  45  it =     3  nf =      355  nj =     0  F = 0.3D-13  inf=    1  time= 0:01
  46  it =     6  nf =      636  nj =     0  F = 0.6D-11  inf=    1  time= 0:06
  47  it =    30  nf =     3949  nj =     0  F = 0.2D+15  inf= 1000  time= 0:08
  48  it =     4  nf =      421  nj =     0  F = 0.8D-09  inf=    1  time= 0:00
  49  it =     4  nf =      465  nj =     0  F = 0.8D-09  inf=    1  time= 0:21
  50  it =     3  nf =      317  nj =     0  F = 0.4D-12  inf=    1  time= 0:01
  51  it =    12  nf =     1262  nj =     0  F = 0.9D-09  inf=    1  time= 0:02
  52  it =    25  nf =     2897  nj =     0  F = 0.5D-04  inf= 1000  time= 0:04
  53  it =     3  nf =      330  nj =     0  F = 0.2D-08  inf=    1  time= 0:03
  54  it =     6  nf =     1205  nj =     0  F = 0.2D-09  inf=    1  time= 0:01
  55  it =     2  nf =      212  nj =     0  F = 0.2D-08  inf=    1  time= 0:00
  56  it =     3  nf =      316  nj =     0  F = 0.2D-09  inf=    1  time= 0:01
  57  it =     4  nf =      421  nj =     0  F = 0.3D-11  inf=    1  time= 0:00
  58           failed due to invalid operation
  59  it =     4  nf =      421  nj =     0  F = 0.2D-12  inf=    1  time= 0:02
  60  it =   149  nf =    18281  nj =     0  F = 0.4D+01  inf= 1000  time= 0:24
  61  it =    25  nf =     5085  nj =     0  F = 0.1D+01  inf= 1000  time= 1:38
  62  it =    11  nf =     1183  nj =     0  F = 0.7D-11  inf=    1  time= 0:02
  63  it =    10  nf =     2027  nj =     0  F = 0.2D-10  inf=    1  time= 0:02
  64  it =     3  nf =      355  nj =     0  F = 0.3D-13  inf=    1  time= 0:02
------------------------------------------------------------------------------
Total  it =  1591  nf =   206688  nj =     0       succesful =  40    time= 6:27
```

```
Test for subroutine nl_ilud_dt:    500  variables
-------------------------------------------------------------------------------
    1  it =    22  nf =    8036  nj =     0  F = 0.2D+01  inf= 1000  time= 0:50
    2  it =    44  nf =   12741  nj =     0  F = 0.1D+01  inf= 1000  time= 1:42
    3  it =     3  nf =     793  nj =     0  F = 0.2D-09  inf=    1  time= 0:08
    4  it =    18  nf =    4722  nj =     0  F = 0.9D-12  inf=    1  time= 0:42
    5          deleted from this test (invalid operation supposed)
    6  it =    17  nf =    4336  nj =     0  F = 0.4D-08  inf=    1  time= 0:39
    7  it =    72  nf =   18940  nj =     0  F = 0.2D+01  inf= 1000  time= 2:38
    8  it =    60  nf =   17588  nj =     0  F = 0.5D+01  inf= 1000  time= 2:13
    9  it =   108  nf =   33439  nj =     0  F = 0.3D+01  inf= 1000  time= 4:06
   10  it =     5  nf =    1276  nj =     0  F = 0.3D-12  inf=    1  time= 0:11
   11  it =    23  nf =   10210  nj =     0  F = 0.2D+06  inf= 1000  time= 0:53
   12  it =    22  nf =    5816  nj =     0  F = 0.6D+01  inf= 1000  time= 0:49
   13  it =    18  nf =    4603  nj =     0  F = 0.4D-08  inf=    1  time= 0:40
   14  it =     4  nf =    1021  nj =     0  F = 0.6D-11  inf=    1  time= 0:09
   15  it =     5  nf =    1503  nj =     0  F = 0.3D-09  inf=    1  time= 0:11
   16  it =    24  nf =    6324  nj =     0  F = 0.3D-01  inf= 1000  time= 0:54
   17  it =    63  nf =   16551  nj =     0  F = 0.2D+00  inf= 1000  time= 2:21
   18  it =    68  nf =   18009  nj =     0  F = 0.1D+01  inf= 1000  time= 2:40
   19  it =     2  nf =     511  nj =     0  F = 0.7D-09  inf=    1  time= 0:04
   20  it =    31  nf =    8561  nj =     0  F = 0.2D+03  inf= 1000  time= 1:10
   21  it =    12  nf =    3063  nj =     0  F = 0.6D-09  inf=    1  time= 0:28
   22  it =    34  nf =   12373  nj =     0  F = 0.3D+01  inf= 1000  time= 1:17
   23  it =    59  nf =   19417  nj =     0  F = 0.7D+00  inf= 1000  time= 2:24
   24  it =     7  nf =    1743  nj =     0  F = 0.6D-09  inf=    1  time= 0:15
   25  it =     3  nf =     742  nj =     0  F = 0.1D-07  inf=    1  time= 0:07
   26  it =     7  nf =    1741  nj =     0  F = 0.3D-11  inf=    1  time= 0:16
   27  it =    13  nf =    3849  nj =     0  F = 0.3D-10  inf=    1  time= 0:27
   28  it =    59  nf =   15168  nj =     0  F = 0.2D+00  inf= 1000  time= 2:07
   29  it =     3  nf =     749  nj =     0  F = 0.5D-08  inf=    1  time= 0:07
   30  it =    23  nf =    8839  nj =     0  F = 0.1D+00  inf= 1000  time= 0:53
   31  it =    15  nf =    4030  nj =     0  F = 0.3D-08  inf=    1  time= 0:34
   32          deleted from this test (invalid operation supposed)
   33          deleted from this test (long time supposed)
   34  it =     4  nf =    1021  nj =     0  F = 0.2D-08  inf=    1  time= 0:09
   35  it =    11  nf =    5367  nj =     0  F = 0.5D-10  inf=    1  time= 0:43
   36  it =     2  nf =     512  nj =     0  F = 0.2D-11  inf=    1  time= 0:05
   37  it =    31  nf =    8213  nj =     0  F = 0.7D+00  inf= 1000  time= 1:51
   38  it =     2  nf =     511  nj =     0  F = 0.3D-08  inf=    1  time= 0:04
   39  it =     4  nf =    1256  nj =     0  F = 0.9D-08  inf=    1  time= 0:09
   40  it =     4  nf =    1085  nj =     0  F = 0.7D-12  inf=    1  time= 0:10
   41          deleted from this test (invalid operation supposed)
   42  it =     2  nf =     511  nj =     0  F = 0.5D-12  inf=    1  time= 0:04
   43  it =     2  nf =     606  nj =     0  F = 0.2D-08  inf=    1  time= 0:05
   44  it =     5  nf =    1520  nj =     0  F = 0.7D-08  inf=    1  time= 0:12
   45  it =     3  nf =     866  nj =     0  F = 0.3D-13  inf=    1  time= 0:13
   46  it =     6  nf =    1545  nj =     0  F = 0.1D-07  inf=    1  time= 1:31
   47  it =    23  nf =   11380  nj =     0  F = 0.9D+14  inf= 1000  time= 2:08
   48  it =     4  nf =    1021  nj =     0  F = 0.8D-09  inf=    1  time= 0:09
   49  it =     4  nf =    1149  nj =     0  F = 0.6D-08  inf=    1  time= 5:10
   50  it =     3  nf =     770  nj =     0  F = 0.5D-12  inf=    1  time= 0:26
   51  it =    12  nf =    3063  nj =     0  F = 0.6D-09  inf=    1  time= 0:27
   52  it =    29  nf =    7783  nj =     0  F = 0.7D-05  inf= 1000  time= 1:05
   53  it =     3  nf =     801  nj =     0  F = 0.2D-08  inf=    1  time= 0:36
   54  it =     6  nf =    2853  nj =     0  F = 0.7D-08  inf=    1  time= 0:14
   55  it =     2  nf =     511  nj =     0  F = 0.7D-09  inf=    1  time= 0:05
   56  it =     3  nf =     767  nj =     0  F = 0.2D-09  inf=    1  time= 0:07
   57  it =     4  nf =    1022  nj =     0  F = 0.3D-11  inf=    1  time= 0:10
   58          deleted from this test (invalid operation supposed)
   59  it =     4  nf =    1021  nj =     0  F = 0.2D-12  inf=    1  time= 0:28
   60  it =    64  nf =   19291  nj =     0  F = 0.1D+02  inf= 1000  time= 2:22
   61          deleted from this test (long time supposed)
   62  it =    11  nf =    2833  nj =     0  F = 0.7D-11  inf=    1  time= 0:24
   63  it =    11  nf =    5382  nj =     0  F = 0.5D-10  inf=    1  time= 0:42
   64  it =     3  nf =     866  nj =     0  F = 0.3D-13  inf=    1  time= 0:23
-------------------------------------------------------------------------------
Total  it =  1106  nf =  330220  nj=     0       succesful =  39     time=52:07
```

```
Test for subroutine hybrj:    100  variables
------------------------------------------------------------------------------
   1  it =    30  nf =      35  nj =     2  F = 0.2D-08  inf=    1  time= 0:00
   2  it =    28  nf =      34  nj =     2  F = 0.2D-08  inf=    1  time= 0:01
   3  it =     7  nf =       7  nj =     1  F = 0.5D-09  inf=    1  time= 0:00
   4  it =    37  nf =      50  nj =     3  F = 0.4D-08  inf=    1  time= 0:00
   5  it =     1  nf =      11  nj =     2  F = 0.7D+01  inf=    5  time= 0:00
   6  it =    25  nf =      27  nj =     2  F = 0.4D-08  inf=    1  time= 0:00
   7  it =   119  nf =     206  nj =    16  F = 0.9D+00  inf=    4  time= 0:01
   8  it =    23  nf =      34  nj =     4  F = 0.5D-10  inf=    1  time= 0:00
   9  it =    26  nf =      52  nj =    11  F = 0.8D+00  inf=    4  time= 0:00
  10  it =    16  nf =      16  nj =     1  F = 0.2D-08  inf=    1  time= 0:00
  11  it =    17  nf =      17  nj =     1  F = 0.5D-09  inf=    1  time= 0:00
  12  it =    25  nf =      25  nj =     1  F = 0.9D-09  inf=    1  time= 0:00
  13  it =    35  nf =      51  nj =     7  F = 0.2D-08  inf=    1  time= 0:00
  14  it =    12  nf =      12  nj =     1  F = 0.2D-08  inf=    1  time= 0:00
  15  it =    70  nf =      76  nj =     1  F = 0.2D-08  inf=    1  time= 0:01
  16  it =    86  nf =     167  nj =     5  F = 0.2D-09  inf=    1  time= 0:00
  17  it =    47  nf =      81  nj =     3  F = 0.4D-11  inf=    1  time= 0:00
  18  it =    48  nf =      82  nj =    14  F = 0.1D+00  inf=    4  time= 0:01
  19  it =     4  nf =       4  nj =     1  F = 0.2D-10  inf=    1  time= 0:00
  20  it =    14  nf =      20  nj =     2  F = 0.5D-08  inf=    1  time= 0:00
  21  it =    28  nf =      33  nj =     3  F = 0.3D-09  inf=    1  time= 0:00
  22  it =     1  nf =      11  nj =     2  F = 0.5D+01  inf=    5  time= 0:00
  23  it =    80  nf =     153  nj =    10  F = 0.6D-01  inf=    4  time= 0:00
  24  it =    34  nf =      59  nj =     7  F = 0.2D-03  inf=    4  time= 0:01
  25  it =     7  nf =       7  nj =     1  F = 0.4D-10  inf=    1  time= 0:00
  26  it =    26  nf =      26  nj =     1  F = 0.2D-08  inf=    1  time= 0:00
  27  it =    27  nf =      30  nj =     2  F = 0.3D-08  inf=    1  time= 0:00
  28  it =    28  nf =      44  nj =     4  F = 0.2D-08  inf=    1  time= 0:00
  29  it =     6  nf =       6  nj =     1  F = 0.3D-09  inf=    1  time= 0:00
  30  it =    26  nf =      36  nj =     4  F = 0.2D-08  inf=    1  time= 0:00
  31  it =    38  nf =      44  nj =     3  F = 0.2D-08  inf=    1  time= 0:00
  32            failed due to invalid operation
  33  it =    18  nf =      42  nj =    11  F = 0.2D+01  inf=    4  time= 0:00
  34  it =     7  nf =       7  nj =     1  F = 0.2D-11  inf=    1  time= 0:00
  35  it =     9  nf =      12  nj =     2  F = 0.4D-09  inf=    1  time= 0:01
  36  it =    11  nf =      21  nj =     2  F = 0.0D+00  inf=    1  time= 0:00
  37  it =     7  nf =       7  nj =     1  F = 0.2D-10  inf=    1  time= 0:00
  38  it =     4  nf =       4  nj =     1  F = 0.3D-12  inf=    1  time= 0:00
  39  it =    27  nf =      28  nj =     1  F = 0.2D-08  inf=    1  time= 0:00
  40  it =     9  nf =       9  nj =     1  F = 0.1D-08  inf=    1  time= 0:00
  41            failed due to invalid operation
  42  it =    26  nf =      26  nj =     1  F = 0.1D-08  inf=    1  time= 0:00
  43  it =     5  nf =       5  nj =     1  F = 0.1D-10  inf=    1  time= 0:00
  44  it =    20  nf =      20  nj =     1  F = 0.4D-08  inf=    1  time= 0:00
  45  it =     5  nf =       5  nj =     1  F = 0.2D-10  inf=    1  time= 0:00
  46  it =    73  nf =     126  nj =    12  F = 0.3D-03  inf=    4  time= 0:01
  47  it =    39  nf =      41  nj =     2  F = 0.0D+00  inf=    1  time= 0:00
  48  it =    12  nf =      12  nj =     1  F = 0.6D-09  inf=    1  time= 0:00
  49  it =     7  nf =       7  nj =     1  F = 0.2D-10  inf=    1  time= 0:00
  50  it =     6  nf =       6  nj =     1  F = 0.2D-09  inf=    1  time= 0:00
  51  it =    28  nf =      33  nj =     3  F = 0.3D-09  inf=    1  time= 0:00
  52  it =     6  nf =       6  nj =     1  F = 0.3D-09  inf=    1  time= 0:00
  53  it =     8  nf =       8  nj =     1  F = 0.9D-10  inf=    1  time= 0:00
  54  it =    26  nf =      46  nj =     4  F = 0.5D-10  inf=    1  time= 0:00
  55  it =     4  nf =       4  nj =     1  F = 0.5D-10  inf=    1  time= 0:01
  56  it =     6  nf =       6  nj =     1  F = 0.8D-09  inf=    1  time= 0:00
  57  it =     8  nf =       8  nj =     1  F = 0.2D-08  inf=    1  time= 0:00
  58  it =     7  nf =      28  nj =     4  F = 0.5D+01  inf=    5  time= 0:00
  59  it =    12  nf =      12  nj =     1  F = 0.1D-08  inf=    1  time= 0:00
  60  it =    63  nf =     105  nj =    12  F = 0.8D+00  inf=    4  time= 0:00
  61  it =    19  nf =      27  nj =     3  F = 0.1D-12  inf=    1  time= 0:00
  62  it =    11  nf =      21  nj =     2  F = 0.0D+00  inf=    1  time= 0:00
  63  it =     9  nf =      12  nj =     2  F = 0.4D-09  inf=    1  time= 0:01
  64  it =     5  nf =       5  nj =     1  F = 0.2D-10  inf=    1  time= 0:00
------------------------------------------------------------------------------
Total  it =  1468  nf =    2155  nj =   196       succesful =  51    time= 0:09
```

```
Test for subroutine hybrj:    200  variables
-------------------------------------------------------------------------------
   1  it =    45  nf =      53  nj =     2  F = 0.1D-08  inf=    1  time= 0:00
   2  it =    21  nf =      28  nj =     3  F = 0.7D-08  inf=    1  time= 0:01
   3  it =     7  nf =       7  nj =     1  F = 0.8D-09  inf=    1  time= 0:00
   4  it =    23  nf =      36  nj =     4  F = 0.2D-08  inf=    1  time= 0:01
   5  it =     1  nf =      11  nj =     2  F = 0.7D+01  inf=    5  time= 0:01
   6  it =    26  nf =      28  nj =     2  F = 0.3D-08  inf=    1  time= 0:00
   7  it =    41  nf =      74  nj =     8  F = 0.2D+01  inf=    4  time= 0:02
   8  it =    31  nf =      39  nj =     4  F = 0.5D-09  inf=    1  time= 0:01
   9  it =    31  nf =      48  nj =     6  F = 0.2D-08  inf=    1  time= 0:01
  10  it =    17  nf =      17  nj =     1  F = 0.6D-09  inf=    1  time= 0:00
  11  it =    17  nf =      17  nj =     1  F = 0.5D-09  inf=    1  time= 0:01
  12  it =    25  nf =      25  nj =     1  F = 0.9D-09  inf=    1  time= 0:00
  13  it =    58  nf =     102  nj =    10  F = 0.3D-08  inf=    1  time= 0:02
  14  it =    12  nf =      12  nj =     1  F = 0.3D-08  inf=    1  time= 0:00
  15  it =    74  nf =      79  nj =     1  F = 0.2D-08  inf=    1  time= 0:01
  16  it =    86  nf =     167  nj =     5  F = 0.2D-09  inf=    1  time= 0:02
  17  it =    47  nf =      81  nj =     3  F = 0.3D-11  inf=    1  time= 0:01
  18  it =    26  nf =      55  nj =    13  F = 0.2D+00  inf=    4  time= 0:03
  19  it =     4  nf =       4  nj =     1  F = 0.5D-11  inf=    1  time= 0:00
  20  it =    16  nf =      22  nj =     2  F = 0.4D-08  inf=    1  time= 0:00
  21  it =    25  nf =      30  nj =     3  F = 0.2D-09  inf=    1  time= 0:01
  22  it =     1  nf =      11  nj =     2  F = 0.4D+01  inf=    5  time= 0:00
  23  it =    51  nf =     103  nj =    10  F = 0.9D-01  inf=    4  time= 0:03
  24  it =    12  nf =      12  nj =     1  F = 0.8D-09  inf=    1  time= 0:00
  25  it =     7  nf =       7  nj =     1  F = 0.2D-10  inf=    1  time= 0:00
  26  it =    27  nf =      27  nj =     1  F = 0.2D-08  inf=    1  time= 0:01
  27  it =    25  nf =      27  nj =     2  F = 0.4D-08  inf=    1  time= 0:00
  28  it =    49  nf =      85  nj =     3  F = 0.4D-08  inf=    1  time= 0:01
  29  it =     6  nf =       6  nj =     1  F = 0.2D-08  inf=    1  time= 0:00
  30  it =    16  nf =      29  nj =     5  F = 0.4D-09  inf=    1  time= 0:01
  31  it =    28  nf =      32  nj =     3  F = 0.2D-08  inf=    1  time= 0:01
  32  it =     1  nf =      26  nj =     2  F = 0.2D+02  inf=    5  time= 0:00
  33  it =    26  nf =      57  nj =    16  F = 0.1D+01  inf=    4  time= 0:01
  34  it =     7  nf =       7  nj =     1  F = 0.2D-11  inf=    1  time= 0:00
  35  it =    20  nf =      31  nj =     4  F = 0.9D-10  inf=    1  time= 0:01
  36  it =    11  nf =      21  nj =     2  F = 0.1D-14  inf=    1  time= 0:01
  37  it =     7  nf =       7  nj =     1  F = 0.1D-10  inf=    1  time= 0:00
  38  it =     3  nf =       3  nj =     1  F = 0.7D-09  inf=    1  time= 0:00
  39  it =    35  nf =      36  nj =     1  F = 0.1D-08  inf=    1  time= 0:01
  40  it =     9  nf =       9  nj =     1  F = 0.1D-08  inf=    1  time= 0:00
  41          failed due to invalid operation
  42  it =    26  nf =      26  nj =     1  F = 0.1D-08  inf=    1  time= 0:00
  43  it =     4  nf =       4  nj =     1  F = 0.5D-09  inf=    1  time= 0:00
  44  it =    20  nf =      20  nj =     1  F = 0.4D-08  inf=    1  time= 0:01
  45  it =     5  nf =       5  nj =     1  F = 0.3D-10  inf=    1  time= 0:00
  46  it =    26  nf =      49  nj =     8  F = 0.4D-08  inf=    1  time= 0:02
  47  it =    47  nf =      51  nj =     3  F = 0.0D+00  inf=    1  time= 0:01
  48  it =    12  nf =      12  nj =     1  F = 0.6D-09  inf=    1  time= 0:00
  49  it =     7  nf =       7  nj =     1  F = 0.1D-09  inf=    1  time= 0:01
  50  it =     6  nf =       6  nj =     1  F = 0.2D-09  inf=    1  time= 0:00
  51  it =    25  nf =      30  nj =     3  F = 0.2D-09  inf=    1  time= 0:01
  52  it =     6  nf =       6  nj =     1  F = 0.6D-10  inf=    1  time= 0:00
  53  it =     8  nf =       8  nj =     1  F = 0.8D-10  inf=    1  time= 0:00
  54  it =     1  nf =      11  nj =     2  F = 0.2D+02  inf=    5  time= 0:00
  55  it =     4  nf =       4  nj =     1  F = 0.1D-10  inf=    1  time= 0:01
  56  it =     7  nf =      12  nj =     3  F = 0.5D-12  inf=    1  time= 0:00
  57  it =    11  nf =      16  nj =     3  F = 0.2D-08  inf=    1  time= 0:01
  58  it =     1  nf =      11  nj =     2  F = 0.7D+01  inf=    5  time= 0:00
  59  it =    12  nf =      12  nj =     1  F = 0.2D-08  inf=    1  time= 0:01
  60  it =    32  nf =      47  nj =     7  F = 0.3D-08  inf=    1  time= 0:01
  61  it =    21  nf =      30  nj =     3  F = 0.3D-11  inf=    1  time= 0:01
  62  it =    11  nf =      21  nj =     2  F = 0.0D+00  inf=    1  time= 0:01
  63  it =    20  nf =      31  nj =     4  F = 0.9D-10  inf=    1  time= 0:01
  64  it =     5  nf =       5  nj =     1  F = 0.3D-10  inf=    1  time= 0:00
-------------------------------------------------------------------------------
Total  it =  1291  nf =    1895  nj =   184       succesful =  54    time= 0:42
```

Test for subroutine hybrj: 500 variables

1	it =	37	nf =	44	nj =	2	F =	0.2D-08	inf=	1	time= 0:08
2	it =	21	nf =	26	nj =	2	F =	0.8D-09	inf=	1	time= 0:06
3	it =	7	nf =	7	nj =	1	F =	0.5D-09	inf=	1	time= 0:04
4	it =	26	nf =	37	nj =	4	F =	0.1D-08	inf=	1	time= 0:13
5	it =	1	nf =	11	nj =	2	F =	0.7D+01	inf=	5	time= 0:06
6	it =	27	nf =	29	nj =	2	F =	0.3D-08	inf=	1	time= 0:07
7	it =	94	nf =	161	nj =	8	F =	0.1D+01	inf=	4	time= 0:30
8	it =	24	nf =	30	nj =	5	F =	0.1D-08	inf=	1	time= 0:15
9	it =	23	nf =	39	nj =	8	F =	0.6D-08	inf=	1	time= 0:24
10	it =	17	nf =	17	nj =	1	F =	0.6D-09	inf=	1	time= 0:04
11	it =	17	nf =	17	nj =	1	F =	0.5D-09	inf=	1	time= 0:04
12	it =	26	nf =	26	nj =	1	F =	0.4D-09	inf=	1	time= 0:04
13	it =	7	nf =	20	nj =	2	F =	0.1D+01	inf=	5	time= 0:04
14	it =	12	nf =	12	nj =	1	F =	0.3D-08	inf=	1	time= 0:03
15	it =	73	nf =	73	nj =	1	F =	0.1D-08	inf=	1	time= 0:06
16	it =	86	nf =	167	nj =	5	F =	0.2D-09	inf=	1	time= 0:23
17	it =	47	nf =	81	nj =	3	F =	0.5D-11	inf=	1	time= 0:12
18	it =	37	nf =	79	nj =	16	F =	0.9D+00	inf=	4	time= 0:49
19	it =	3	nf =	3	nj =	1	F =	0.7D-09	inf=	1	time= 0:03
20	it =	25	nf =	34	nj =	2	F =	0.5D-08	inf=	1	time= 0:08
21	it =	27	nf =	31	nj =	3	F =	0.5D-09	inf=	1	time= 0:09
22	it =	1	nf =	11	nj =	2	F =	0.3D+01	inf=	5	time= 0:06
23	it =	36	nf =	72	nj =	9	F =	0.8D-01	inf=	4	time= 0:29
24	it =	11	nf =	11	nj =	1	F =	0.3D-09	inf=	1	time= 0:03
25	it =	6	nf =	6	nj =	1	F =	0.9D-09	inf=	1	time= 0:02
26	it =	25	nf =	25	nj =	1	F =	0.1D-08	inf=	1	time= 0:04
27	it =	27	nf =	29	nj =	2	F =	0.1D-08	inf=	1	time= 0:06
28	it =	24	nf =	40	nj =	4	F =	0.1D-08	inf=	1	time= 0:12
29	it =	6	nf =	6	nj =	1	F =	0.4D-09	inf=	1	time= 0:03
30	it =	33	nf =	39	nj =	3	F =	0.2D-08	inf=	1	time= 0:09
31	it =	20	nf =	32	nj =	4	F =	0.2D-09	inf=	1	time= 0:12
32		deleted from this test (invalid operation supposed)									
33	it =	29	nf =	64	nj =	18	F =	0.2D+01	inf=	4	time= 0:07
34	it =	7	nf =	7	nj =	1	F =	0.2D-11	inf=	1	time= 0:03
35	it =	13	nf =	16	nj =	2	F =	0.4D-08	inf=	1	time= 0:06
36	it =	11	nf =	21	nj =	2	F =	0.0D+00	inf=	1	time= 0:08
37	it =	7	nf =	7	nj =	1	F =	0.1D-10	inf=	1	time= 0:03
38	it =	3	nf =	3	nj =	1	F =	0.1D-09	inf=	1	time= 0:03
39	it =	43	nf =	45	nj =	1	F =	0.1D-08	inf=	1	time= 0:05
40	it =	9	nf =	9	nj =	1	F =	0.2D-08	inf=	1	time= 0:03
41		deleted from this test (invalid operation supposed)									
42	it =	26	nf =	26	nj =	1	F =	0.1D-08	inf=	1	time= 0:04
43	it =	4	nf =	4	nj =	1	F =	0.8D-10	inf=	1	time= 0:03
44	it =	20	nf =	20	nj =	1	F =	0.4D-08	inf=	1	time= 0:04
45	it =	5	nf =	5	nj =	1	F =	0.3D-10	inf=	1	time= 0:03
46	it =	57	nf =	109	nj =	15	F =	0.5D-05	inf=	4	time= 0:55
47	it =	76	nf =	84	nj =	5	F =	0.2D-05	inf=	1	time= 0:18
48	it =	12	nf =	12	nj =	1	F =	0.6D-09	inf=	1	time= 0:03
49	it =	7	nf =	7	nj =	1	F =	0.2D-08	inf=	1	time= 0:06
50	it =	6	nf =	6	nj =	1	F =	0.2D-09	inf=	1	time= 0:03
51	it =	27	nf =	31	nj =	3	F =	0.5D-09	inf=	1	time= 0:10
52	it =	5	nf =	5	nj =	1	F =	0.6D-09	inf=	1	time= 0:03
53	it =	8	nf =	8	nj =	1	F =	0.8D-10	inf=	1	time= 0:03
54	it =	1	nf =	11	nj =	2	F =	0.2D+02	inf=	5	time= 0:06
55	it =	4	nf =	4	nj =	1	F =	0.2D-11	inf=	1	time= 0:03
56	it =	6	nf =	10	nj =	3	F =	0.1D-12	inf=	1	time= 0:09
57	it =	8	nf =	14	nj =	4	F =	0.1D-12	inf=	1	time= 0:12
58	it =	1	nf =	11	nj =	2	F =	0.7D+01	inf=	5	time= 0:06
59	it =	13	nf =	13	nj =	1	F =	0.6D-09	inf=	1	time= 0:03
60	it =	36	nf =	51	nj =	7	F =	0.6D-08	inf=	1	time= 0:22
61	it =	18	nf =	23	nj =	3	F =	0.2D-08	inf=	1	time= 0:14
62	it =	11	nf =	21	nj =	2	F =	0.0D+00	inf=	1	time= 0:07
63	it =	13	nf =	16	nj =	2	F =	0.4D-08	inf=	1	time= 0:06
64	it =	5	nf =	5	nj =	1	F =	0.3D-10	inf=	1	time= 0:03
Total	it =	1317	nf =	1883	nj =	186		succesful =		51	time= 9:32

```
Test for subroutine hybrd:    100  variables
-------------------------------------------------------------------------------
    1  it =    30  nf =     235  nj =     0  F = 0.2D-08  inf=    1  time= 0:00
    2  it =    28  nf =     234  nj =     0  F = 0.2D-08  inf=    1  time= 0:00
    3  it =     7  nf =     107  nj =     0  F = 0.5D-09  inf=    1  time= 0:00
    4  it =    37  nf =     350  nj =     0  F = 0.4D-08  inf=    1  time= 0:00
    5          failed due to invalid operation
    6  it =    25  nf =     227  nj =     0  F = 0.4D-08  inf=    1  time= 0:01
    7  it =   261  nf =    1977  nj =     0  F = 0.9D+00  inf=    4  time= 0:01
    8  it =    23  nf =     434  nj =     0  F = 0.5D-10  inf=    1  time= 0:00
    9  it =    26  nf =    1152  nj =     0  F = 0.8D+00  inf=    4  time= 0:00
   10  it =    16  nf =     116  nj =     0  F = 0.2D-08  inf=    1  time= 0:00
   11  it =    17  nf =     117  nj =     0  F = 0.5D-09  inf=    1  time= 0:00
   12  it =    25  nf =     125  nj =     0  F = 0.9D-09  inf=    1  time= 0:00
   13  it =    27  nf =     638  nj =     0  F = 0.1D-08  inf=    1  time= 0:01
   14  it =    12  nf =     112  nj =     0  F = 0.2D-08  inf=    1  time= 0:00
   15  it =    70  nf =     176  nj =     0  F = 0.2D-08  inf=    1  time= 0:00
   16  it =    86  nf =     667  nj =     0  F = 0.2D-09  inf=    1  time= 0:00
   17  it =    48  nf =     382  nj =     0  F = 0.1D-09  inf=    1  time= 0:00
   18  it =    25  nf =    1358  nj =     0  F = 0.4D+00  inf=    4  time= 0:01
   19  it =     4  nf =     104  nj =     0  F = 0.2D-10  inf=    1  time= 0:00
   20  it =    14  nf =     220  nj =     0  F = 0.5D-08  inf=    1  time= 0:00
   21  it =    28  nf =     333  nj =     0  F = 0.3D-09  inf=    1  time= 0:00
   22  it =     1  nf =     211  nj =     0  F = 0.5D+01  inf=    5  time= 0:00
   23  it =    37  nf =    1178  nj =     0  F = 0.1D+00  inf=    4  time= 0:01
   24  it =    34  nf =     759  nj =     0  F = 0.2D-03  inf=    4  time= 0:00
   25  it =     7  nf =     107  nj =     0  F = 0.4D-10  inf=    1  time= 0:00
   26  it =    26  nf =     126  nj =     0  F = 0.2D-08  inf=    1  time= 0:00
   27  it =    27  nf =     230  nj =     0  F = 0.3D-08  inf=    1  time= 0:00
   28  it =    29  nf =     445  nj =     0  F = 0.1D-08  inf=    1  time= 0:00
   29  it =     6  nf =     106  nj =     0  F = 0.3D-09  inf=    1  time= 0:00
   30  it =    26  nf =     436  nj =     0  F = 0.2D-08  inf=    1  time= 0:01
   31  it =    38  nf =     342  nj =     0  F = 0.2D-08  inf=    1  time= 0:00
   32          failed due to invalid operation
   33  it =     1  nf =     211  nj =     0  F = 0.4D+02  inf=    5  time= 0:00
   34  it =     7  nf =     107  nj =     0  F = 0.2D-11  inf=    1  time= 0:00
   35  it =     9  nf =     212  nj =     0  F = 0.4D-09  inf=    1  time= 0:00
   36  it =    11  nf =     221  nj =     0  F = 0.6D-12  inf=    1  time= 0:00
   37  it =     7  nf =     107  nj =     0  F = 0.2D-10  inf=    1  time= 0:00
   38  it =     4  nf =     104  nj =     0  F = 0.3D-12  inf=    1  time= 0:00
   39  it =    27  nf =     128  nj =     0  F = 0.2D-08  inf=    1  time= 0:00
   40  it =     9  nf =     109  nj =     0  F = 0.1D-08  inf=    1  time= 0:00
   41          failed due to invalid operation
   42  it =    26  nf =     126  nj =     0  F = 0.1D-08  inf=    1  time= 0:00
   43  it =     5  nf =     105  nj =     0  F = 0.1D-10  inf=    1  time= 0:00
   44  it =    20  nf =     120  nj =     0  F = 0.4D-08  inf=    1  time= 0:00
   45  it =     5  nf =     105  nj =     0  F = 0.2D-10  inf=    1  time= 0:00
   46  it =    49  nf =    1498  nj =     0  F = 0.2D-03  inf=    4  time= 0:04
   47  it =    21  nf =     333  nj =     0  F = 0.3D+11  inf=    5  time= 0:00
   48  it =    12  nf =     112  nj =     0  F = 0.6D-09  inf=    1  time= 0:00
   49  it =     7  nf =     107  nj =     0  F = 0.2D-10  inf=    1  time= 0:01
   50  it =     6  nf =     106  nj =     0  F = 0.2D-09  inf=    1  time= 0:00
   51  it =    28  nf =     333  nj =     0  F = 0.3D-09  inf=    1  time= 0:00
   52  it =     6  nf =     106  nj =     0  F = 0.3D-09  inf=    1  time= 0:00
   53  it =     8  nf =     108  nj =     0  F = 0.9D-10  inf=    1  time= 0:01
   54  it =     1  nf =     223  nj =     0  F = 0.2D+02  inf=    5  time= 0:00
   55  it =     4  nf =     104  nj =     0  F = 0.5D-10  inf=    1  time= 0:00
   56  it =     6  nf =     106  nj =     0  F = 0.8D-09  inf=    1  time= 0:00
   57  it =     8  nf =     108  nj =     0  F = 0.2D-08  inf=    1  time= 0:00
   58  it =     1  nf =     209  nj =     0  F = 0.7D+01  inf=    5  time= 0:00
   59  it =    12  nf =     112  nj =     0  F = 0.1D-08  inf=    1  time= 0:00
   60  it =    64  nf =    1309  nj =     0  F = 0.8D+00  inf=    4  time= 0:01
   61  it =    30  nf =     649  nj =     0  F = 0.6D+00  inf=    4  time= 0:02
   62  it =    11  nf =     221  nj =     0  F = 0.6D-12  inf=    1  time= 0:00
   63  it =     9  nf =     212  nj =     0  F = 0.4D-09  inf=    1  time= 0:00
   64  it =     5  nf =     105  nj =     0  F = 0.2D-10  inf=    1  time= 0:01
-------------------------------------------------------------------------------
Total  it =  1459  nf =   20720  nj =     0       succesful =  48    time= 0:16
```

```
Test for subroutine hybrd:    200  variables
-------------------------------------------------------------------------------
   1  it =    45  nf =     453  nj =     0  F = 0.1D-08  inf=    1  time= 0:00
   2  it =    21  nf =     628  nj =     0  F = 0.7D-08  inf=    1  time= 0:01
   3  it =     7  nf =     207  nj =     0  F = 0.8D-09  inf=    1  time= 0:00
   4  it =    23  nf =     836  nj =     0  F = 0.2D-08  inf=    1  time= 0:01
   5          failed due to invalid operation
   6  it =    26  nf =     428  nj =     0  F = 0.3D-08  inf=    1  time= 0:01
   7  it =    41  nf =    1674  nj =     0  F = 0.2D+01  inf=    4  time= 0:02
   8  it =    31  nf =     839  nj =     0  F = 0.5D-09  inf=    1  time= 0:01
   9  it =    31  nf =    1248  nj =     0  F = 0.2D-08  inf=    1  time= 0:01
  10  it =    17  nf =     217  nj =     0  F = 0.6D-09  inf=    1  time= 0:00
  11  it =    17  nf =     217  nj =     0  F = 0.5D-09  inf=    1  time= 0:01
  12  it =    25  nf =     225  nj =     0  F = 0.9D-09  inf=    1  time= 0:00
  13  it =    27  nf =    1238  nj =     0  F = 0.1D-08  inf=    1  time= 0:01
  14  it =    12  nf =     212  nj =     0  F = 0.3D-08  inf=    1  time= 0:01
  15  it =    74  nf =     279  nj =     0  F = 0.2D-08  inf=    1  time= 0:00
  16  it =    86  nf =    1167  nj =     0  F = 0.2D-09  inf=    1  time= 0:02
  17  it =    48  nf =     682  nj =     0  F = 0.2D-09  inf=    1  time= 0:01
  18  it =    16  nf =    2043  nj =     0  F = 0.6D+00  inf=    2  time= 0:03
  19  it =     4  nf =     204  nj =     0  F = 0.5D-11  inf=    1  time= 0:00
  20  it =    16  nf =     422  nj =     0  F = 0.4D-08  inf=    1  time= 0:00
  21  it =    25  nf =     630  nj =     0  F = 0.2D-09  inf=    1  time= 0:01
  22  it =     1  nf =     411  nj =     0  F = 0.4D+01  inf=    5  time= 0:01
  23  it =    47  nf =    2095  nj =     0  F = 0.1D+00  inf=    4  time= 0:02
  24  it =    12  nf =     208  nj =     0  F = 0.8D-09  inf=    1  time= 0:00
  25  it =     7  nf =     203  nj =     0  F = 0.2D-10  inf=    1  time= 0:00
  26  it =    27  nf =     223  nj =     0  F = 0.2D-08  inf=    1  time= 0:01
  27  it =    25  nf =     419  nj =     0  F = 0.4D-08  inf=    1  time= 0:00
  28  it =    43  nf =     663  nj =     0  F = 0.2D-08  inf=    1  time= 0:01
  29  it =     6  nf =     202  nj =     0  F = 0.2D-08  inf=    1  time= 0:01
  30  it =    16  nf =    1009  nj =     0  F = 0.4D-09  inf=    1  time= 0:01
  31  it =    28  nf =     632  nj =     0  F = 0.2D-08  inf=    1  time= 0:00
  32  it =     1  nf =     426  nj =     0  F = 0.2D+02  inf=    5  time= 0:01
  33  it =     1  nf =     411  nj =     0  F = 0.8D+02  inf=    5  time= 0:00
  34  it =     7  nf =     207  nj =     0  F = 0.2D-11  inf=    1  time= 0:01
  35  it =    11  nf =     414  nj =     0  F = 0.3D-09  inf=    1  time= 0:00
  36  it =    11  nf =     421  nj =     0  F = 0.6D-12  inf=    1  time= 0:01
  37  it =     7  nf =     207  nj =     0  F = 0.1D-10  inf=    1  time= 0:00
  38  it =     3  nf =     203  nj =     0  F = 0.7D-09  inf=    1  time= 0:00
  39  it =    35  nf =     236  nj =     0  F = 0.1D-08  inf=    1  time= 0:01
  40  it =     9  nf =     209  nj =     0  F = 0.1D-08  inf=    1  time= 0:00
  41          failed due to invalid operation
  42  it =    26  nf =     226  nj =     0  F = 0.1D-08  inf=    1  time= 0:00
  43  it =     4  nf =     204  nj =     0  F = 0.5D-09  inf=    1  time= 0:01
  44  it =    20  nf =     220  nj =     0  F = 0.4D-08  inf=    1  time= 0:00
  45  it =     5  nf =     205  nj =     0  F = 0.3D-10  inf=    1  time= 0:00
  46  it =    27  nf =    1653  nj =     0  F = 0.1D-08  inf=    1  time= 0:14
  47  it =    37  nf =     653  nj =     0  F = 0.5D+12  inf=    5  time= 0:02
  48  it =    12  nf =     212  nj =     0  F = 0.6D-09  inf=    1  time= 0:00
  49  it =     7  nf =     207  nj =     0  F = 0.1D-09  inf=    1  time= 0:09
  50  it =     6  nf =     206  nj =     0  F = 0.2D-09  inf=    1  time= 0:01
  51  it =    25  nf =     630  nj =     0  F = 0.2D-09  inf=    1  time= 0:00
  52  it =     6  nf =     206  nj =     0  F = 0.6D-10  inf=    1  time= 0:01
  53  it =     8  nf =     208  nj =     0  F = 0.8D-10  inf=    1  time= 0:01
  54  it =    25  nf =    1248  nj =     0  F = 0.1D-10  inf=    1  time= 0:01
  55  it =     4  nf =     204  nj =     0  F = 0.1D-10  inf=    1  time= 0:00
  56  it =    37  nf =     447  nj =     0  F = 0.2D+01  inf=    5  time= 0:01
  57  it =    21  nf =     628  nj =     0  F = 0.2D-09  inf=    1  time= 0:01
  58          failed due to invalid operation
  59  it =    12  nf =     212  nj =     0  F = 0.2D-08  inf=    1  time= 0:01
  60  it =    32  nf =    1447  nj =     0  F = 0.1D-08  inf=    1  time= 0:01
  61  it =    38  nf =    1464  nj =     0  F = 0.6D+00  inf=    4  time= 0:28
  62  it =    11  nf =     421  nj =     0  F = 0.6D-12  inf=    1  time= 0:01
  63  it =    11  nf =     414  nj =     0  F = 0.3D-09  inf=    1  time= 0:00
  64  it =     5  nf =     205  nj =     0  F = 0.3D-10  inf=    1  time= 0:01
-------------------------------------------------------------------------------
Total  it =  1268  nf =   34168  nj =     0       succesful =  52    time= 1:32
```

```
Test for subroutine hybrd:    500  variables
-----------------------------------------------------------------------------
   1  it =    37  nf =    1044  nj =     0  F = 0.2D-08  inf=    1  time= 0:08
   2  it =    21  nf =    1026  nj =     0  F = 0.8D-09  inf=    1  time= 0:09
   3  it =     7  nf =     507  nj =     0  F = 0.5D-09  inf=    1  time= 0:04
   4  it =    11  nf =    2022  nj =     0  F = 0.4D+01  inf=    2  time= 0:13
   5           deleted from this test (invalid operation supposed)
   6  it =    27  nf =    1029  nj =     0  F = 0.3D-08  inf=    1  time= 0:07
   7  it =    85  nf =    2147  nj =     0  F = 0.1D+01  inf=    2  time= 0:20
   8  it =    14  nf =    2019  nj =     0  F = 0.2D+01  inf=    2  time= 0:12
   9  it =     9  nf =    2015  nj =     0  F = 0.4D+01  inf=    2  time= 0:13
  10  it =    17  nf =     517  nj =     0  F = 0.6D-09  inf=    1  time= 0:04
  11  it =    17  nf =     517  nj =     0  F = 0.5D-09  inf=    1  time= 0:04
  12  it =    26  nf =     526  nj =     0  F = 0.4D-09  inf=    1  time= 0:04
  13  it =    13  nf =    2020  nj =     0  F = 0.6D-03  inf=    2  time= 0:12
  14  it =    12  nf =     512  nj =     0  F = 0.3D-08  inf=    1  time= 0:04
  15  it =    73  nf =     573  nj =     0  F = 0.1D-08  inf=    1  time= 0:06
  16  it =    26  nf =    2050  nj =     0  F = 0.9D-03  inf=    2  time= 0:15
  17  it =    48  nf =    1582  nj =     0  F = 0.2D-09  inf=    1  time= 0:13
  18  it =     7  nf =    2018  nj =     0  F = 0.1D+01  inf=    2  time= 0:13
  19  it =     3  nf =     503  nj =     0  F = 0.7D-09  inf=    1  time= 0:03
  20  it =    20  nf =    1528  nj =     0  F = 0.1D-08  inf=    1  time= 0:10
  21  it =    27  nf =    1531  nj =     0  F = 0.5D-09  inf=    1  time= 0:11
  22  it =     1  nf =    1011  nj =     0  F = 0.3D+01  inf=    5  time= 0:07
  23  it =     4  nf =    2015  nj =     0  F = 0.3D+00  inf=    2  time= 0:12
  24  it =    11  nf =     495  nj =     0  F = 0.3D-09  inf=    1  time= 0:03
  25  it =     6  nf =     490  nj =     0  F = 0.9D-09  inf=    1  time= 0:03
  26  it =    25  nf =     509  nj =     0  F = 0.1D-08  inf=    1  time= 0:04
  27  it =    27  nf =     997  nj =     0  F = 0.1D-08  inf=    1  time= 0:07
  28  it =    24  nf =    1976  nj =     0  F = 0.1D-08  inf=    1  time= 0:13
  29  it =     6  nf =     490  nj =     0  F = 0.4D-09  inf=    1  time= 0:03
  30  it =    33  nf =    1491  nj =     0  F = 0.2D-08  inf=    1  time= 0:10
  31  it =    23  nf =    2036  nj =     0  F = 0.2D-01  inf=    2  time= 0:14
  32           deleted from this test (invalid operation supposed)
  33  it =     1  nf =    1011  nj =     0  F = 0.2D+03  inf=    5  time= 0:06
  34  it =     7  nf =     507  nj =     0  F = 0.2D-11  inf=    1  time= 0:03
  35  it =    13  nf =    1016  nj =     0  F = 0.4D-08  inf=    1  time= 0:10
  36  it =    11  nf =    1021  nj =     0  F = 0.6D-12  inf=    1  time= 0:07
  37  it =     7  nf =     507  nj =     0  F = 0.1D-10  inf=    1  time= 0:05
  38  it =     3  nf =     503  nj =     0  F = 0.1D-09  inf=    1  time= 0:03
  39  it =    43  nf =     545  nj =     0  F = 0.1D-08  inf=    1  time= 0:05
  40  it =     9  nf =     509  nj =     0  F = 0.2D-08  inf=    1  time= 0:03
  41           deleted from this test (invalid operation supposed)
  42  it =    26  nf =     526  nj =     0  F = 0.1D-08  inf=    1  time= 0:05
  43  it =     4  nf =     504  nj =     0  F = 0.8D-10  inf=    1  time= 0:03
  44  it =    20  nf =     520  nj =     0  F = 0.4D-08  inf=    1  time= 0:04
  45  it =     5  nf =     505  nj =     0  F = 0.3D-10  inf=    1  time= 0:06
  46  it =    10  nf =    2021  nj =     0  F = 0.2D-02  inf=    2  time= 1:49
  47  it =    27  nf =    2037  nj =     0  F = 0.3D+13  inf=    2  time= 0:22
  48  it =    12  nf =     512  nj =     0  F = 0.6D-09  inf=    1  time= 0:04
  49  it =     7  nf =     507  nj =     0  F = 0.2D-08  inf=    1  time= 2:18
  50  it =     6  nf =     506  nj =     0  F = 0.2D-09  inf=    1  time= 0:15
  51  it =    27  nf =    1531  nj =     0  F = 0.5D-09  inf=    1  time= 0:10
  52  it =     5  nf =     505  nj =     0  F = 0.6D-09  inf=    1  time= 0:03
  53  it =     8  nf =     508  nj =     0  F = 0.8D-10  inf=    1  time= 0:19
  54  it =     1  nf =    1011  nj =     0  F = 0.2D+02  inf=    5  time= 0:07
  55  it =     4  nf =     504  nj =     0  F = 0.2D-11  inf=    1  time= 0:03
  56  it =    30  nf =    1034  nj =     0  F = 0.2D+01  inf=    5  time= 0:07
  57  it =     2  nf =    1511  nj =     0  F = 0.2D+02  inf=    5  time= 0:10
  58           deleted from this test (invalid operation supposed)
  59  it =    13  nf =     513  nj =     0  F = 0.6D-09  inf=    1  time= 0:13
  60  it =    10  nf =    2015  nj =     0  F = 0.8D+01  inf=    2  time= 0:12
  61           deleted from this test (long time supposed)
  62  it =    11  nf =    1021  nj =     0  F = 0.6D-12  inf=    1  time= 0:06
  63  it =    13  nf =    1016  nj =     0  F = 0.4D-08  inf=    1  time= 0:09
  64  it =     5  nf =     505  nj =     0  F = 0.3D-10  inf=    1  time= 0:12
-----------------------------------------------------------------------------
Total  it =  1000  nf =   62127  nj =     0       succesful =  42    time=12:00
```

```
Test for subroutine soneq4:    100  variables
--------------------------------------------------------------------------------
    1  it =    10  nf =      16  nj =    10  F = 0.3D-13  inf=    0  time= 0:00
    2  it =    13  nf =     107  nj =    13  F = 0.2D+00  inf=    3  time= 0:00
    3  it =     3  nf =       5  nj =     3  F = 0.7D-10  inf=    0  time= 0:00
    4  it =     7  nf =      10  nj =     7  F = 0.3D-08  inf=    0  time= 0:00
    5  it =     0  nf =       2  nj =     1  F = 0.7D+01  inf=    2  time= 0:00
    6  it =    16  nf =      18  nj =    16  F = 0.3D-08  inf=    0  time= 0:00
    7  it =    27  nf =      43  nj =    27  F = 0.0D+00  inf=    0  time= 0:00
    8  it =    12  nf =      27  nj =    12  F = 0.6D-10  inf=    0  time= 0:00
    9  it =    13  nf =      20  nj =    13  F = 0.7D-13  inf=    0  time= 0:00
   10  it =     5  nf =       7  nj =     5  F = 0.8D-13  inf=    0  time= 0:00
   11  it =    12  nf =      14  nj =    12  F = 0.0D+00  inf=    0  time= 0:00
   12  it =    17  nf =      19  nj =    17  F = 0.7D-09  inf=    0  time= 0:00
   13  it =     0  nf =       2  nj =     1  F = 0.1D+01  inf=    2  time= 0:00
   14  it =     4  nf =       6  nj =     4  F = 0.2D-11  inf=    0  time= 0:00
   15  it =     5  nf =       7  nj =     5  F = 0.9D-09  inf=    0  time= 0:00
   16  it =    13  nf =      16  nj =    13  F = 0.2D-14  inf=    0  time= 0:00
   17  it =    15  nf =      25  nj =    15  F = 0.6D-14  inf=    0  time= 0:00
   18  it =    24  nf =     173  nj =    24  F = 0.6D+00  inf=    3  time= 0:00
   19  it =     2  nf =       4  nj =     2  F = 0.2D-09  inf=    0  time= 0:00
   20  it =     9  nf =      14  nj =     9  F = 0.8D-08  inf=    0  time= 0:00
   21  it =    13  nf =      15  nj =    13  F = 0.5D-15  inf=    0  time= 0:00
   22  it =     7  nf =      26  nj =     7  F = 0.1D-11  inf=    0  time= 0:00
   23  it =    11  nf =     105  nj =    11  F = 0.8D+00  inf=    3  time= 0:00
   24  it =     9  nf =      58  nj =     9  F = 0.3D-03  inf=    3  time= 0:01
   25  it =     4  nf =       6  nj =     4  F = 0.9D-15  inf=    0  time= 0:00
   26  it =     9  nf =      11  nj =     9  F = 0.1D-12  inf=    0  time= 0:00
   27  it =     8  nf =      10  nj =     8  F = 0.5D-10  inf=    0  time= 0:00
   28  it =     9  nf =      23  nj =     9  F = 0.7D-14  inf=    0  time= 0:00
   29  it =    15  nf =      17  nj =    15  F = 0.1D-08  inf=    0  time= 0:00
   30  it =     8  nf =      17  nj =     8  F = 0.5D-09  inf=    0  time= 0:00
   31  it =    13  nf =      29  nj =    13  F = 0.2D-10  inf=    0  time= 0:00
   32          failed due to invalid operation
   33  it =     0  nf =       2  nj =     1  F = 0.4D+02  inf=    2  time= 0:00
   34  it =     5  nf =       7  nj =     5  F = 0.5D-18  inf=    0  time= 0:00
   35          failed due to invalid operation
   36  it =    11  nf =      39  nj =    11  F = 0.0D+00  inf=    0  time= 0:00
   37  it =     5  nf =       7  nj =     5  F = 0.7D-15  inf=    0  time= 0:00
   38  it =     2  nf =       4  nj =     2  F = 0.1D-10  inf=    0  time= 0:00
   39  it =     5  nf =       8  nj =     5  F = 0.3D-14  inf=    0  time= 0:00
   40  it =     4  nf =       6  nj =     4  F = 0.3D-12  inf=    0  time= 0:00
   41          failed due to invalid operation
   42  it =     5  nf =       7  nj =     5  F = 0.3D-15  inf=    0  time= 0:00
   43  it =     3  nf =       5  nj =     3  F = 0.3D-15  inf=    0  time= 0:00
   44  it =     6  nf =       8  nj =     6  F = 0.9D-15  inf=    0  time= 0:00
   45  it =     3  nf =       5  nj =     3  F = 0.3D-14  inf=    0  time= 0:00
   46  it =    13  nf =      50  nj =    13  F = 0.2D-11  inf=    0  time= 0:00
   47  it =    25  nf =      27  nj =    25  F = 0.5D-10  inf=    0  time= 0:01
   48  it =     4  nf =       6  nj =     4  F = 0.8D-09  inf=    0  time= 0:00
   49  it =     3  nf =       5  nj =     3  F = 0.1D-10  inf=    0  time= 0:00
   50  it =     3  nf =       5  nj =     3  F = 0.6D-11  inf=    0  time= 0:00
   51  it =    13  nf =      15  nj =    13  F = 0.5D-15  inf=    0  time= 0:00
   52  it =     4  nf =       6  nj =     4  F = 0.1D-14  inf=    0  time= 0:00
   53  it =     4  nf =       6  nj =     4  F = 0.1D-11  inf=    0  time= 0:00
   54          failed due to invalid operation
   55  it =     2  nf =       4  nj =     2  F = 0.9D-09  inf=    0  time= 0:00
   56  it =     3  nf =       5  nj =     3  F = 0.4D-10  inf=    0  time= 0:00
   57  it =     4  nf =       6  nj =     4  F = 0.1D-13  inf=    0  time= 0:00
   58  it =     0  nf =       2  nj =     1  F = 0.7D+01  inf=    2  time= 0:00
   59  it =     5  nf =       7  nj =     5  F = 0.9D-13  inf=    0  time= 0:00
   60  it =    13  nf =      20  nj =    13  F = 0.1D-09  inf=    0  time= 0:00
   61  it =     5  nf =       7  nj =     5  F = 0.2D-13  inf=    0  time= 0:00
   62  it =    11  nf =      39  nj =    11  F = 0.0D+00  inf=    0  time= 0:00
   63          failed due to invalid operation
   64  it =     3  nf =       5  nj =     3  F = 0.3D-14  inf=    0  time= 0:00
--------------------------------------------------------------------------------
Total  it =   477  nf =    1165  nj =   481      succesful =  51    time= 0:02
```

```
Test for subroutine soneq4:    200  variables
------------------------------------------------------------------------------
   1  it =    10  nf =      14  nj =    10  F = 0.2D-11  inf=    0  time= 0:01
   2  it =    23  nf =      99  nj =    23  F = 0.8D-12  inf=    0  time= 0:00
   3  it =     3  nf =       5  nj =     3  F = 0.1D-09  inf=    0  time= 0:00
   4  it =     7  nf =      10  nj =     7  F = 0.3D-08  inf=    0  time= 0:00
   5  it =     0  nf =       2  nj =     1  F = 0.7D+01  inf=    2  time= 0:00
   6  it =    16  nf =      18  nj =    16  F = 0.3D-08  inf=    0  time= 0:00
   7  it =    37  nf =      67  nj =    37  F = 0.3D-08  inf=    0  time= 0:00
   8  it =    13  nf =      31  nj =    13  F = 0.7D-11  inf=    0  time= 0:00
   9  it =    13  nf =      22  nj =    13  F = 0.3D-10  inf=    0  time= 0:00
  10  it =     5  nf =       7  nj =     5  F = 0.8D-13  inf=    0  time= 0:01
  11  it =    12  nf =      14  nj =    12  F = 0.0D+00  inf=    0  time= 0:00
  12  it =    17  nf =      19  nj =    17  F = 0.7D-09  inf=    0  time= 0:00
  13  it =     0  nf =       2  nj =     1  F = 0.1D+01  inf=    2  time= 0:00
  14  it =     4  nf =       6  nj =     4  F = 0.2D-11  inf=    0  time= 0:00
  15  it =     5  nf =       7  nj =     5  F = 0.9D-09  inf=    0  time= 0:00
  16  it =    13  nf =      16  nj =    13  F = 0.2D-14  inf=    0  time= 0:00
  17  it =    15  nf =      25  nj =    15  F = 0.6D-14  inf=    0  time= 0:00
  18  it =    62  nf =     428  nj =    62  F = 0.5D+00  inf=    3  time= 0:01
  19  it =     2  nf =       4  nj =     2  F = 0.5D-10  inf=    0  time= 0:00
  20  it =    10  nf =      15  nj =    10  F = 0.8D-10  inf=    0  time= 0:00
  21  it =    12  nf =      14  nj =    12  F = 0.6D-09  inf=    0  time= 0:00
  22  it =     7  nf =      26  nj =     7  F = 0.3D-10  inf=    0  time= 0:00
  23  it =    11  nf =     111  nj =    11  F = 0.8D+00  inf=    3  time= 0:00
  24  it =     8  nf =      10  nj =     8  F = 0.2D-09  inf=    0  time= 0:00
  25  it =     4  nf =       6  nj =     4  F = 0.7D-15  inf=    0  time= 0:00
  26  it =     8  nf =      10  nj =     8  F = 0.2D-08  inf=    0  time= 0:01
  27  it =     8  nf =      10  nj =     8  F = 0.8D-10  inf=    0  time= 0:00
  28  it =    10  nf =      27  nj =    10  F = 0.7D-14  inf=    0  time= 0:00
  29  it =    14  nf =      16  nj =    14  F = 0.1D-08  inf=    0  time= 0:00
  30  it =     8  nf =      20  nj =     8  F = 0.4D-12  inf=    0  time= 0:00
  31  it =    13  nf =      29  nj =    13  F = 0.2D-11  inf=    0  time= 0:00
  32            failed due to invalid operation
  33  it =     0  nf =       2  nj =     1  F = 0.8D+02  inf=    2  time= 0:00
  34  it =     5  nf =       7  nj =     5  F = 0.5D-18  inf=    0  time= 0:00
  35  it =     0  nf =       2  nj =     1  F = 0.1D+03  inf=    2  time= 0:01
  36  it =    11  nf =      39  nj =    11  F = 0.0D+00  inf=    0  time= 0:00
  37  it =     5  nf =       7  nj =     5  F = 0.4D-15  inf=    0  time= 0:00
  38  it =     2  nf =       4  nj =     2  F = 0.3D-11  inf=    0  time= 0:00
  39  it =     5  nf =       8  nj =     5  F = 0.3D-14  inf=    0  time= 0:00
  40  it =     4  nf =       6  nj =     4  F = 0.3D-12  inf=    0  time= 0:01
  41  it =     1  nf =       3  nj =     2  F = 0.6D+00  inf=    2  time= 0:00
  42  it =     5  nf =       7  nj =     5  F = 0.3D-15  inf=    0  time= 0:00
  43  it =     2  nf =       4  nj =     2  F = 0.9D-09  inf=    0  time= 0:00
  44  it =     6  nf =       8  nj =     6  F = 0.9D-15  inf=    0  time= 0:00
  45  it =     3  nf =       5  nj =     3  F = 0.3D-14  inf=    0  time= 0:00
  46  it =    19  nf =      94  nj =    19  F = 0.2D-10  inf=    0  time= 0:04
  47  it =    29  nf =      31  nj =    29  F = 0.0D+00  inf=    0  time= 0:03
  48  it =     4  nf =       6  nj =     4  F = 0.8D-09  inf=    0  time= 0:00
  49  it =     4  nf =       6  nj =     4  F = 0.2D-09  inf=    0  time= 0:01
  50  it =     3  nf =       5  nj =     3  F = 0.6D-11  inf=    0  time= 0:01
  51  it =    12  nf =      14  nj =    12  F = 0.6D-09  inf=    0  time= 0:00
  52  it =     3  nf =       5  nj =     3  F = 0.7D-09  inf=    0  time= 0:00
  53  it =     4  nf =       6  nj =     4  F = 0.1D-11  inf=    0  time= 0:00
  54  it =     6  nf =      16  nj =     6  F = 0.9D-11  inf=    0  time= 0:01
  55  it =     2  nf =       4  nj =     2  F = 0.2D-09  inf=    0  time= 0:00
  56  it =     0  nf =       2  nj =     1  F = 0.2D+01  inf=    2  time= 0:00
  57  it =     0  nf =       2  nj =     1  F = 0.2D+02  inf=    2  time= 0:00
  58  it =     0  nf =       2  nj =     1  F = 0.7D+01  inf=    2  time= 0:00
  59  it =     5  nf =       7  nj =     5  F = 0.1D-12  inf=    0  time= 0:00
  60  it =    13  nf =      22  nj =    13  F = 0.3D-10  inf=    0  time= 0:00
  61  it =     5  nf =       7  nj =     5  F = 0.3D-12  inf=    0  time= 0:01
  62  it =    11  nf =      39  nj =    11  F = 0.0D+00  inf=    0  time= 0:00
  63  it =     0  nf =       2  nj =     1  F = 0.1D+03  inf=    2  time= 0:01
  64  it =     3  nf =       5  nj =     3  F = 0.3D-14  inf=    0  time= 0:00
------------------------------------------------------------------------------
Total  it =   542  nf =    1467  nj =   551       succesful =  52    time= 0:18
```

```
Test for subroutine soneq4:    500  variables
-------------------------------------------------------------------------------
    1  it =    11  nf =      17  nj =    11  F = 0.3D-11  inf=    0  time= 0:00
    2  it =     7  nf =      42  nj =     7  F = 0.2D+00  inf=    3  time= 0:04
    3  it =     3  nf =       5  nj =     3  F = 0.7D-10  inf=    0  time= 0:01
    4  it =     7  nf =      10  nj =     7  F = 0.3D-08  inf=    0  time= 0:00
    5  it =     0  nf =       2  nj =     1  F = 0.7D+01  inf=    2  time= 0:00
    6  it =    16  nf =      18  nj =    16  F = 0.3D-08  inf=    0  time= 0:01
    7  it =    37  nf =      67  nj =    37  F = 0.3D-08  inf=    0  time= 0:02
    8  it =     8  nf =      44  nj =     8  F = 0.3D+02  inf=    3  time= 0:00
    9  it =    13  nf =      22  nj =    13  F = 0.3D-10  inf=    0  time= 0:01
   10  it =     5  nf =       7  nj =     5  F = 0.8D-13  inf=    0  time= 0:00
   11  it =    12  nf =      14  nj =    12  F = 0.0D+00  inf=    0  time= 0:01
   12  it =    17  nf =      19  nj =    17  F = 0.7D-09  inf=    0  time= 0:01
   13  it =     0  nf =       2  nj =     1  F = 0.1D+01  inf=    2  time= 0:00
   14  it =     4  nf =       6  nj =     4  F = 0.2D-11  inf=    0  time= 0:00
   15  it =     5  nf =       7  nj =     5  F = 0.9D-09  inf=    0  time= 0:00
   16  it =    13  nf =      16  nj =    13  F = 0.2D-14  inf=    0  time= 0:01
   17  it =    15  nf =      25  nj =    15  F = 0.6D-14  inf=    0  time= 0:01
   18  it =    43  nf =     240  nj =    43  F = 0.2D+00  inf=    3  time= 0:02
   19  it =     2  nf =       4  nj =     2  F = 0.7D-11  inf=    0  time= 0:00
   20  it =    11  nf =      16  nj =    11  F = 0.2D-10  inf=    0  time= 0:01
   21  it =    12  nf =      14  nj =    12  F = 0.9D-10  inf=    0  time= 0:01
   22  it =     7  nf =      25  nj =     7  F = 0.1D-10  inf=    0  time= 0:00
   23  it =     3  nf =      33  nj =     3  F = 0.8D+00  inf=    3  time= 0:04
   24  it =     7  nf =       9  nj =     7  F = 0.3D-09  inf=    0  time= 0:01
   25  it =     4  nf =       6  nj =     4  F = 0.1D-14  inf=    0  time= 0:01
   26  it =     8  nf =      10  nj =     8  F = 0.2D-12  inf=    0  time= 0:01
   27  it =     8  nf =      10  nj =     8  F = 0.1D-09  inf=    0  time= 0:02
   28  it =    10  nf =      25  nj =    10  F = 0.2D-14  inf=    0  time= 0:02
   29  it =    11  nf =      13  nj =    11  F = 0.1D-08  inf=    0  time= 0:04
   30  it =     7  nf =      13  nj =     7  F = 0.1D-11  inf=    0  time= 0:02
   31  it =    13  nf =      29  nj =    13  F = 0.8D-12  inf=    0  time= 0:01
   32              deleted from this test (invalid operation supposed)
   33  it =     0  nf =       2  nj =     1  F = 0.2D+03  inf=    2  time= 0:00
   34  it =     5  nf =       7  nj =     5  F = 0.5D-18  inf=    0  time= 0:00
   35  it =     0  nf =       2  nj =     1  F = 0.3D+03  inf=    2  time= 0:04
   36  it =    11  nf =      39  nj =    11  F = 0.0D+00  inf=    0  time= 0:00
   37  it =     5  nf =       7  nj =     5  F = 0.6D-15  inf=    0  time= 0:17
   38  it =     2  nf =       4  nj =     2  F = 0.5D-12  inf=    0  time= 0:00
   39  it =     5  nf =       8  nj =     5  F = 0.3D-14  inf=    0  time= 0:00
   40  it =     4  nf =       6  nj =     4  F = 0.3D-12  inf=    0  time= 0:01
   41  it =     1  nf =       3  nj =     2  F = 0.6D+00  inf=    2  time= 0:00
   42  it =     5  nf =       7  nj =     5  F = 0.3D-15  inf=    0  time= 0:00
   43  it =     2  nf =       4  nj =     2  F = 0.1D-09  inf=    0  time= 0:00
   44  it =     6  nf =       8  nj =     6  F = 0.9D-15  inf=    0  time= 0:01
   45  it =     3  nf =       5  nj =     3  F = 0.3D-14  inf=    0  time= 0:10
   46  it =    38  nf =     280  nj =    38  F = 0.8D-08  inf=    0  time= 2:30
   47  it =     0  nf =       2  nj =     1  F = 0.6D+18  inf=    2  time= 0:00
   48  it =     4  nf =       6  nj =     4  F = 0.8D-09  inf=    0  time= 0:00
   49  it =     5  nf =       6  nj =     5  F = 0.2D-08  inf=    0  time= 0:20
   50  it =     3  nf =       5  nj =     3  F = 0.6D-11  inf=    0  time= 0:10
   51  it =    12  nf =      14  nj =    12  F = 0.9D-10  inf=    0  time= 0:01
   52  it =     3  nf =       5  nj =     3  F = 0.1D-09  inf=    0  time= 0:00
   53  it =     4  nf =       6  nj =     4  F = 0.1D-11  inf=    0  time= 0:14
   54  it =     6  nf =      16  nj =     6  F = 0.7D-08  inf=    0  time= 0:00
   55  it =     2  nf =       4  nj =     2  F = 0.4D-10  inf=    0  time= 0:01
   56  it =     0  nf =       2  nj =     1  F = 0.2D+01  inf=    2  time= 0:01
   57  it =     0  nf =       2  nj =     1  F = 0.2D+02  inf=    2  time= 0:00
   58  it =     0  nf =       2  nj =     1  F = 0.7D+01  inf=    2  time= 0:00
   59  it =     5  nf =       7  nj =     5  F = 0.2D-12  inf=    0  time= 0:18
   60  it =    13  nf =      22  nj =    13  F = 0.3D-10  inf=    0  time= 0:00
   61  it =     5  nf =       7  nj =     5  F = 0.8D-11  inf=    0  time= 0:20
   62  it =    11  nf =      39  nj =    11  F = 0.0D+00  inf=    0  time= 0:00
   63  it =     0  nf =       2  nj =     1  F = 0.3D+03  inf=    2  time= 0:04
   64  it =     3  nf =       5  nj =     3  F = 0.3D-14  inf=    0  time= 0:10
-------------------------------------------------------------------------------
Total  it =   482  nf =    1304  nj =   492       succesful =  49    time= 5:17
```

```
Test for subroutine soneq4_d:    100  variables
-------------------------------------------------------------------------------
    1  it =    10  nf =    2016  nj =     0  F = 0.3D-13  inf=    0  time= 0:01
    2  it =    13  nf =    2707  nj =     0  F = 0.2D+00  inf=    3  time= 0:00
    3  it =     3  nf =     605  nj =     0  F = 0.7D-10  inf=    0  time= 0:00
    4  it =     7  nf =    1410  nj =     0  F = 0.3D-08  inf=    0  time= 0:00
    5  it =     1  nf =     216  nj =     0  F = 0.7D+01  inf=    3  time= 0:00
    6  it =    16  nf =    3218  nj =     0  F = 0.3D-08  inf=    0  time= 0:00
    7  it =    27  nf =    5443  nj =     0  F = 0.0D+00  inf=    0  time= 0:00
    8  it =    12  nf =    2427  nj =     0  F = 0.6D-10  inf=    0  time= 0:00
    9  it =    13  nf =    2620  nj =     0  F = 0.6D-13  inf=    0  time= 0:00
   10  it =     5  nf =    1007  nj =     0  F = 0.8D-13  inf=    0  time= 0:00
   11  it =    12  nf =    2414  nj =     0  F = 0.4D-14  inf=    0  time= 0:00
   12  it =    17  nf =    3419  nj =     0  F = 0.7D-09  inf=    0  time= 0:00
   13  it =    17  nf =    3421  nj =     0  F = 0.7D-09  inf=    0  time= 0:01
   14  it =     4  nf =     806  nj =     0  F = 0.2D-11  inf=    0  time= 0:00
   15  it =     5  nf =    1007  nj =     0  F = 0.9D-09  inf=    0  time= 0:00
   16  it =    13  nf =    2616  nj =     0  F = 0.2D-14  inf=    0  time= 0:00
   17  it =    15  nf =    3025  nj =     0  F = 0.2D-13  inf=    0  time= 0:00
   18  it =    21  nf =    4349  nj =     0  F = 0.5D+00  inf=    3  time= 0:00
   19  it =     2  nf =     404  nj =     0  F = 0.2D-09  inf=    0  time= 0:00
   20  it =     9  nf =    1814  nj =     0  F = 0.8D-08  inf=    0  time= 0:00
   21  it =    13  nf =    2615  nj =     0  F = 0.5D-15  inf=    0  time= 0:00
   22  it =     7  nf =    1426  nj =     0  F = 0.1D-11  inf=    0  time= 0:00
   23  it =    11  nf =    2305  nj =     0  F = 0.8D+00  inf=    3  time= 0:01
   24  it =     9  nf =    1858  nj =     0  F = 0.3D-03  inf=    3  time= 0:00
   25  it =     4  nf =     806  nj =     0  F = 0.8D-15  inf=    0  time= 0:00
   26  it =     8  nf =    1610  nj =     0  F = 0.4D-08  inf=    0  time= 0:00
   27  it =     8  nf =    1610  nj =     0  F = 0.5D-10  inf=    0  time= 0:00
   28  it =     9  nf =    1823  nj =     0  F = 0.7D-14  inf=    0  time= 0:00
   29  it =     2  nf =     404  nj =     0  F = 0.1D-10  inf=    0  time= 0:00
   30  it =     8  nf =    1617  nj =     0  F = 0.5D-09  inf=    0  time= 0:00
   31  it =    13  nf =    2629  nj =     0  F = 0.2D-10  inf=    0  time= 0:01
   32             failed due to invalid operation
   33  it =     0  nf =     202  nj =     0  F = 0.4D+02  inf=    2  time= 0:00
   34  it =     5  nf =    1007  nj =     0  F = 0.5D-18  inf=    0  time= 0:00
   35  it =     0  nf =     202  nj =     0  F = 0.5D+02  inf=    2  time= 0:00
   36  it =    11  nf =    2239  nj =     0  F = 0.3D-10  inf=    0  time= 0:00
   37  it =     5  nf =    1007  nj =     0  F = 0.7D-15  inf=    0  time= 0:00
   38  it =     2  nf =     404  nj =     0  F = 0.1D-10  inf=    0  time= 0:00
   39  it =     5  nf =    1008  nj =     0  F = 0.4D-14  inf=    0  time= 0:00
   40  it =     4  nf =     806  nj =     0  F = 0.3D-12  inf=    0  time= 0:00
   41             failed due to invalid operation
   42  it =     5  nf =    1007  nj =     0  F = 0.2D-15  inf=    0  time= 0:00
   43  it =     3  nf =     605  nj =     0  F = 0.3D-15  inf=    0  time= 0:00
   44  it =     6  nf =    1208  nj =     0  F = 0.7D-15  inf=    0  time= 0:00
   45  it =     3  nf =     605  nj =     0  F = 0.3D-14  inf=    0  time= 0:01
   46  it =    13  nf =    2650  nj =     0  F = 0.2D-11  inf=    0  time= 0:05
   47  it =     0  nf =     202  nj =     0  F = 0.8D+13  inf=    2  time= 0:00
   48  it =     4  nf =     806  nj =     0  F = 0.8D-09  inf=    0  time= 0:00
   49  it =     3  nf =     605  nj =     0  F = 0.1D-10  inf=    0  time= 0:06
   50  it =     3  nf =     605  nj =     0  F = 0.6D-11  inf=    0  time= 0:01
   51  it =    13  nf =    2615  nj =     0  F = 0.5D-15  inf=    0  time= 0:00
   52  it =     4  nf =     806  nj =     0  F = 0.1D-14  inf=    0  time= 0:00
   53  it =     4  nf =     806  nj =     0  F = 0.1D-11  inf=    0  time= 0:01
   54             failed due to invalid operation
   55  it =     2  nf =     404  nj =     0  F = 0.9D-09  inf=    0  time= 0:00
   56  it =     3  nf =     605  nj =     0  F = 0.4D-10  inf=    0  time= 0:00
   57  it =     4  nf =     806  nj =     0  F = 0.1D-13  inf=    0  time= 0:00
   58  it =     1  nf =     216  nj =     0  F = 0.7D+01  inf=    3  time= 0:00
   59  it =     5  nf =    1007  nj =     0  F = 0.9D-13  inf=    0  time= 0:01
   60  it =    13  nf =    2620  nj =     0  F = 0.6D-13  inf=    0  time= 0:00
   61  it =     2  nf =     419  nj =     0  F = 0.1D+01  inf=    3  time= 0:02
   62  it =    11  nf =    2239  nj =     0  F = 0.3D-10  inf=    0  time= 0:00
   63  it =     0  nf =     202  nj =     0  F = 0.5D+02  inf=    2  time= 0:00
   64  it =     3  nf =     605  nj =     0  F = 0.3D-14  inf=    0  time= 0:01
-------------------------------------------------------------------------------
Total  it =   451  nf =   92165  nj =     0       succesful =  50    time= 0:22
```

```
Test for subroutine soneq4_d:    200  variables
------------------------------------------------------------------------------
   1  it =    10  nf =    4014  nj =     0  F = 0.2D-11  inf=    0  time= 0:00
   2  it =    23  nf =    9299  nj =     0  F = 0.8D-12  inf=    0  time= 0:00
   3  it =     3  nf =    1205  nj =     0  F = 0.1D-09  inf=    0  time= 0:01
   4  it =     7  nf =    2810  nj =     0  F = 0.3D-08  inf=    0  time= 0:00
   5  it =     1  nf =     416  nj =     0  F = 0.7D+01  inf=    3  time= 0:00
   6  it =    16  nf =    6418  nj =     0  F = 0.3D-08  inf=    0  time= 0:01
   7  it =    37  nf =   14867  nj =     0  F = 0.3D-08  inf=    0  time= 0:00
   8  it =    13  nf =    5231  nj =     0  F = 0.7D-11  inf=    0  time= 0:01
   9  it =    13  nf =    5222  nj =     0  F = 0.3D-10  inf=    0  time= 0:00
  10  it =     5  nf =    2007  nj =     0  F = 0.8D-13  inf=    0  time= 0:00
  11  it =    12  nf =    4814  nj =     0  F = 0.4D-14  inf=    0  time= 0:01
  12  it =    17  nf =    6819  nj =     0  F = 0.7D-09  inf=    0  time= 0:00
  13  it =    17  nf =    6821  nj =     0  F = 0.7D-09  inf=    0  time= 0:00
  14  it =     4  nf =    1606  nj =     0  F = 0.2D-11  inf=    0  time= 0:01
  15  it =     5  nf =    2007  nj =     0  F = 0.9D-09  inf=    0  time= 0:00
  16  it =    13  nf =    5216  nj =     0  F = 0.2D-14  inf=    0  time= 0:00
  17  it =    15  nf =    6025  nj =     0  F = 0.2D-13  inf=    0  time= 0:01
  18  it =    60  nf =   24545  nj =     0  F = 0.6D+00  inf=    3  time= 0:03
  19  it =     2  nf =     804  nj =     0  F = 0.5D-10  inf=    0  time= 0:00
  20  it =    10  nf =    4015  nj =     0  F = 0.8D-10  inf=    0  time= 0:01
  21  it =    12  nf =    4814  nj =     0  F = 0.6D-09  inf=    0  time= 0:00
  22  it =     7  nf =    2826  nj =     0  F = 0.3D-10  inf=    0  time= 0:00
  23  it =    11  nf =    4511  nj =     0  F = 0.8D+00  inf=    3  time= 0:01
  24  it =     8  nf =    3146  nj =     0  F = 0.2D-09  inf=    0  time= 0:01
  25  it =     4  nf =    1574  nj =     0  F = 0.8D-15  inf=    0  time= 0:00
  26  it =     8  nf =    3146  nj =     0  F = 0.2D-08  inf=    0  time= 0:01
  27  it =     8  nf =    3146  nj =     0  F = 0.8D-10  inf=    0  time= 0:00
  28  it =    10  nf =    3947  nj =     0  F = 0.7D-14  inf=    0  time= 0:00
  29  it =     2  nf =     788  nj =     0  F = 0.2D-10  inf=    0  time= 0:01
  30  it =     8  nf =    3156  nj =     0  F = 0.4D-12  inf=    0  time= 0:00
  31  it =    13  nf =    5229  nj =     0  F = 0.2D-11  inf=    0  time= 0:01
  32              failed due to invalid operation
  33  it =     0  nf =     402  nj =     0  F = 0.8D+02  inf=    2  time= 0:00
  34  it =     5  nf =    2007  nj =     0  F = 0.5D-18  inf=    0  time= 0:00
  35  it =     0  nf =     402  nj =     0  F = 0.1D+03  inf=    2  time= 0:00
  36  it =    11  nf =    4439  nj =     0  F = 0.3D-10  inf=    0  time= 0:01
  37  it =     5  nf =    2007  nj =     0  F = 0.7D-15  inf=    0  time= 0:02
  38  it =     2  nf =     804  nj =     0  F = 0.3D-11  inf=    0  time= 0:00
  39  it =     5  nf =    2008  nj =     0  F = 0.3D-14  inf=    0  time= 0:00
  40  it =     4  nf =    1606  nj =     0  F = 0.3D-12  inf=    0  time= 0:00
  41  it =     1  nf =     803  nj =     0  F = 0.6D+00  inf=    2  time= 0:00
  42  it =     5  nf =    2007  nj =     0  F = 0.2D-15  inf=    0  time= 0:00
  43  it =     2  nf =     804  nj =     0  F = 0.9D-09  inf=    0  time= 0:00
  44  it =     6  nf =    2408  nj =     0  F = 0.7D-15  inf=    0  time= 0:01
  45  it =     3  nf =    1205  nj =     0  F = 0.3D-14  inf=    0  time= 0:02
  46  it =    18  nf =    7295  nj =     0  F = 0.3D-08  inf=    0  time= 1:03
  47  it =     0  nf =     402  nj =     0  F = 0.1D+16  inf=    2  time= 0:01
  48  it =     4  nf =    1606  nj =     0  F = 0.8D-09  inf=    0  time= 0:00
  49  it =     4  nf =    1606  nj =     0  F = 0.1D-09  inf=    0  time= 1:07
  50  it =     3  nf =    1205  nj =     0  F = 0.6D-11  inf=    0  time= 0:05
  51  it =    12  nf =    4814  nj =     0  F = 0.6D-09  inf=    0  time= 0:01
  52  it =     3  nf =    1205  nj =     0  F = 0.7D-09  inf=    0  time= 0:00
  53  it =     4  nf =    1606  nj =     0  F = 0.1D-11  inf=    0  time= 0:09
  54  it =     6  nf =    2416  nj =     0  F = 0.9D-11  inf=    0  time= 0:01
  55  it =     2  nf =     804  nj =     0  F = 0.2D-09  inf=    0  time= 0:00
  56  it =     0  nf =     402  nj =     0  F = 0.2D+03  inf=    2  time= 0:00
  57  it =     0  nf =     402  nj =     0  F = 0.5D+03  inf=    2  time= 0:00
  58  it =     1  nf =     416  nj =     0  F = 0.7D+01  inf=    3  time= 0:00
  59  it =     5  nf =    2007  nj =     0  F = 0.1D-12  inf=    0  time= 0:07
  60  it =    13  nf =    5222  nj =     0  F = 0.3D-10  inf=    0  time= 0:00
  61  it =    11  nf =    4457  nj =     0  F = 0.1D+01  inf=    3  time= 1:22
  62  it =    11  nf =    4439  nj =     0  F = 0.3D-10  inf=    0  time= 0:00
  63  it =     0  nf =     402  nj =     0  F = 0.1D+03  inf=    2  time= 0:00
  64  it =     3  nf =    1205  nj =     0  F = 0.3D-14  inf=    0  time= 0:04
------------------------------------------------------------------------------
Total  it =   523  nf =  213257  nj =     0       succesful =  51    time= 4:21
```

```
Test for subroutine tensolve:    100  variables
-------------------------------------------------------------------------------
   1  it =     0  nf =      11  nj =    10  F = 0.6D-08  inf=    1  time= 0:00
   2           deleted from this test (long time supposed)
   3  it =    10  nf =       4  nj =     4  F = 0.7D-10  inf=    1  time= 0:00
   4  it =     4  nf =      10  nj =     8  F = 0.0D+00  inf=    1  time= 0:00
   5  it =     8  nf =      12  nj =     8  F = 0.6D-09  inf=    1  time= 0:00
   6  it =     8  nf =      17  nj =    17  F = 0.3D-08  inf=    1  time= 0:00
   7  it =    17  nf =      31  nj =    26  F = 0.3D-14  inf=    1  time= 0:01
   8  it =    26  nf =      32  nj =    19  F = 0.1D-08  inf=    1  time= 0:00
   9  it =    19  nf =      19  nj =    13  F = 0.1D+01  inf=    6  time= 0:00
  10  it =    13  nf =       6  nj =     6  F = 0.8D-13  inf=    1  time= 0:00
  11  it =     6  nf =      13  nj =    13  F = 0.2D-09  inf=    1  time= 0:00
  12  it =    13  nf =      17  nj =    17  F = 0.3D-08  inf=    1  time= 0:00
  13  it =    17  nf =      17  nj =    16  F = 0.9D-08  inf=    1  time= 0:01
  14  it =    16  nf =       5  nj =     5  F = 0.2D-11  inf=    1  time= 0:00
  15  it =     5  nf =       6  nj =     6  F = 0.9D-09  inf=    1  time= 0:00
  16  it =     6  nf =      28  nj =    18  F = 0.9D-03  inf=    3  time= 0:00
  17  it =    18  nf =      24  nj =    18  F = 0.3D-12  inf=    1  time= 0:00
  18  it =    18  nf =      16  nj =    16  F = 0.1D-12  inf=    1  time= 0:00
  19  it =    16  nf =       3  nj =     3  F = 0.2D-09  inf=    1  time= 0:00
  20  it =     3  nf =      12  nj =    11  F = 0.3D-12  inf=    1  time= 0:00
  21  it =    11  nf =      13  nj =    13  F = 0.2D-08  inf=    1  time= 0:01
  22  it =    13  nf =      17  nj =     9  F = 0.4D-10  inf=    1  time= 0:00
  23  it =     9  nf =    3444  nj =   501  F = 0.6D+00  inf=    5  time= 0:06
  24  it =   501  nf =      50  nj =    10  F = 0.3D-03  inf=    4  time= 0:00
  25  it =    10  nf =       5  nj =     5  F = 0.7D-15  inf=    1  time= 0:00
  26  it =     5  nf =      10  nj =    10  F = 0.2D-12  inf=    1  time= 0:00
  27  it =    10  nf =       9  nj =     9  F = 0.5D-10  inf=    1  time= 0:01
  28  it =     9  nf =      17  nj =    11  F = 0.4D-10  inf=    1  time= 0:00
  29  it =    11  nf =      14  nj =    14  F = 0.9D-08  inf=    1  time= 0:00
  30  it =    14  nf =      18  nj =    12  F = 0.3D-13  inf=    1  time= 0:00
  31  it =    12  nf =      15  nj =    13  F = 0.2D-10  inf=    1  time= 0:00
  32           failed due to invalid operation
  33  it =    13  nf =     142  nj =    64  F = 0.8D-08  inf=    1  time= 0:02
  34  it =    64  nf =       5  nj =     5  F = 0.2D-08  inf=    1  time= 0:00
  35  it =     5  nf =       5  nj =     5  F = 0.5D-09  inf=    1  time= 0:00
  36  it =     5  nf =      27  nj =    15  F = 0.2D-14  inf=    1  time= 0:00
  37  it =    15  nf =       5  nj =     5  F = 0.1D-07  inf=    1  time= 0:00
  38  it =     5  nf =       3  nj =     3  F = 0.1D-10  inf=    1  time= 0:00
  39  it =     3  nf =       7  nj =     6  F = 0.5D-08  inf=    1  time= 0:00
  40  it =     6  nf =       5  nj =     5  F = 0.3D-12  inf=    1  time= 0:00
  41  it =     5  nf =       6  nj =     6  F = 0.4D-15  inf=    1  time= 0:00
  42  it =     6  nf =       6  nj =     6  F = 0.3D-15  inf=    1  time= 0:00
  43  it =     6  nf =       3  nj =     3  F = 0.4D-08  inf=    1  time= 0:00
  44  it =     3  nf =       6  nj =     6  F = 0.9D-08  inf=    1  time= 0:00
  45  it =     6  nf =       4  nj =     4  F = 0.3D-14  inf=    1  time= 0:00
  46  it =     4  nf =      32  nj =    15  F = 0.5D-11  inf=    1  time= 0:01
  47  it =    15  nf =      26  nj =    26  F = 0.5D-10  inf=    1  time= 0:00
  48  it =    26  nf =       5  nj =     5  F = 0.8D-09  inf=    1  time= 0:00
  49  it =     5  nf =       4  nj =     4  F = 0.1D-10  inf=    1  time= 0:01
  50  it =     4  nf =       4  nj =     4  F = 0.6D-11  inf=    1  time= 0:00
  51  it =     4  nf =      13  nj =    13  F = 0.2D-08  inf=    1  time= 0:00
  52  it =    13  nf =       4  nj =     4  F = 0.3D-08  inf=    1  time= 0:00
  53  it =     4  nf =       5  nj =     5  F = 0.1D-11  inf=    1  time= 0:00
  54           failed due to invalid operation
  55  it =     5  nf =       3  nj =     3  F = 0.9D-09  inf=    1  time= 0:00
  56  it =     3  nf =       4  nj =     4  F = 0.4D-10  inf=    1  time= 0:00
  57  it =     4  nf =       5  nj =     5  F = 0.1D-13  inf=    1  time= 0:00
  58  it =     5  nf =       5  nj =     5  F = 0.1D-10  inf=    1  time= 0:00
  59  it =     5  nf =       6  nj =     6  F = 0.9D-13  inf=    1  time= 0:00
  60  it =     6  nf =      25  nj =    18  F = 0.7D-09  inf=    1  time= 0:00
  61  it =    18  nf =     501  nj =   501  F = 0.3D-06  inf=    5  time= 0:24
  62  it =   501  nf =      27  nj =    15  F = 0.2D-14  inf=    1  time= 0:00
  63  it =    15  nf =       5  nj =     5  F = 0.5D-09  inf=    1  time= 0:00
  64  it =     5  nf =       4  nj =     4  F = 0.3D-14  inf=    1  time= 0:00
-------------------------------------------------------------------------------
Total  it =  1616  nf =    4797  nj =  1616       succesful =  56    time= 0:38
```

```
Test for subroutine tensolve:    200  variables
-------------------------------------------------------------------------------
   1  it =     0  nf =      12  nj =     11  F = 0.1D-12  inf=    1  time= 0:01
   2  it =    11  nf =     198  nj =     26  F = 0.2D+00  inf=    4  time= 0:02
   3  it =    26  nf =       4  nj =      4  F = 0.1D-09  inf=    1  time= 0:01
   4  it =     4  nf =      10  nj =      8  F = 0.0D+00  inf=    1  time= 0:00
   5  it =     8  nf =      12  nj =      8  F = 0.4D-08  inf=    1  time= 0:02
   6  it =     8  nf =      17  nj =     17  F = 0.3D-08  inf=    1  time= 0:01
   7  it =    17  nf =     128  nj =     60  F = 0.2D-08  inf=    1  time= 0:04
   8  it =    60  nf =      21  nj =     16  F = 0.1D-09  inf=    1  time= 0:02
   9  it =    16  nf =      38  nj =     25  F = 0.5D-08  inf=    1  time= 0:02
  10  it =    25  nf =       6  nj =      6  F = 0.8D-13  inf=    1  time= 0:00
  11  it =     6  nf =      14  nj =     14  F = 0.9D-13  inf=    1  time= 0:01
  12  it =    14  nf =      17  nj =     17  F = 0.3D-08  inf=    1  time= 0:01
  13  it =    17  nf =      17  nj =     16  F = 0.9D-08  inf=    1  time= 0:01
  14  it =    16  nf =       5  nj =      5  F = 0.2D-11  inf=    1  time= 0:00
  15  it =     5  nf =       6  nj =      6  F = 0.9D-09  inf=    1  time= 0:01
  16  it =     6  nf =      28  nj =     18  F = 0.9D-03  inf=    3  time= 0:01
  17  it =    18  nf =      24  nj =     18  F = 0.3D-12  inf=    1  time= 0:01
  18  it =    18  nf =      12  nj =     12  F = 0.4D-12  inf=    1  time= 0:01
  19  it =    12  nf =       3  nj =      3  F = 0.5D-10  inf=    1  time= 0:00
  20  it =     3  nf =      12  nj =     11  F = 0.1D-09  inf=    1  time= 0:01
  21  it =    11  nf =      13  nj =     13  F = 0.6D-09  inf=    1  time= 0:01
  22  it =    13  nf =      15  nj =      8  F = 0.5D-08  inf=    1  time= 0:01
  23  it =     8  nf =    3272  nj =    501  F = 0.8D+00  inf=    5  time= 0:44
  24  it =   501  nf =       9  nj =      9  F = 0.2D-09  inf=    1  time= 0:01
  25  it =     9  nf =       5  nj =      5  F = 0.8D-15  inf=    1  time= 0:00
  26  it =     5  nf =       9  nj =      9  F = 0.2D-08  inf=    1  time= 0:01
  27  it =     9  nf =       9  nj =      9  F = 0.8D-10  inf=    1  time= 0:01
  28  it =     9  nf =      23  nj =     14  F = 0.7D-13  inf=    1  time= 0:01
  29  it =    14  nf =      13  nj =     13  F = 0.8D-08  inf=    1  time= 0:01
  30  it =    13  nf =      16  nj =     11  F = 0.1D-09  inf=    1  time= 0:01
  31  it =    11  nf =      14  nj =     12  F = 0.2D-11  inf=    1  time= 0:00
  32            failed due to invalid operation
  33  it =    12  nf =     291  nj =    114  F = 0.4D-08  inf=    1  time= 0:19
  34  it =   114  nf =       5  nj =      5  F = 0.2D-08  inf=    1  time= 0:01
  35  it =     5  nf =       5  nj =      5  F = 0.1D-09  inf=    1  time= 0:00
  36  it =     5  nf =      27  nj =     15  F = 0.2D-14  inf=    1  time= 0:01
  37  it =    15  nf =       5  nj =      5  F = 0.9D-08  inf=    1  time= 0:01
  38  it =     5  nf =       3  nj =      3  F = 0.3D-11  inf=    1  time= 0:00
  39  it =     3  nf =       7  nj =      6  F = 0.1D-07  inf=    1  time= 0:00
  40  it =     6  nf =       5  nj =      5  F = 0.3D-12  inf=    1  time= 0:00
  41  it =     5  nf =       6  nj =      6  F = 0.4D-15  inf=    1  time= 0:01
  42  it =     6  nf =       6  nj =      6  F = 0.3D-15  inf=    1  time= 0:01
  43  it =     6  nf =       3  nj =      3  F = 0.9D-09  inf=    1  time= 0:00
  44  it =     3  nf =       6  nj =      6  F = 0.9D-08  inf=    1  time= 0:00
  45  it =     6  nf =       4  nj =      4  F = 0.3D-14  inf=    1  time= 0:01
  46  it =     4  nf =      62  nj =     25  F = 0.9D-11  inf=    1  time= 0:03
  47  it =    25  nf =      30  nj =     30  F = 0.0D+00  inf=    1  time= 0:06
  48  it =    30  nf =       5  nj =      5  F = 0.8D-09  inf=    1  time= 0:00
  49  it =     5  nf =       5  nj =      5  F = 0.2D-09  inf=    1  time= 0:01
  50  it =     5  nf =       4  nj =      4  F = 0.6D-11  inf=    1  time= 0:01
  51  it =     4  nf =      13  nj =     13  F = 0.6D-09  inf=    1  time= 0:00
  52  it =    13  nf =       4  nj =      4  F = 0.7D-09  inf=    1  time= 0:01
  53  it =     4  nf =       5  nj =      5  F = 0.1D-11  inf=    1  time= 0:00
  54  it =     5  nf =      10  nj =      7  F = 0.2D-08  inf=    1  time= 0:01
  55  it =     7  nf =       3  nj =      3  F = 0.2D-09  inf=    1  time= 0:00
  56  it =     3  nf =       4  nj =      4  F = 0.2D-10  inf=    1  time= 0:01
  57  it =     4  nf =       5  nj =      5  F = 0.1D-11  inf=    1  time= 0:01
  58  it =     5  nf =       7  nj =      7  F = 0.3D-10  inf=    1  time= 0:01
  59  it =     7  nf =       6  nj =      6  F = 0.1D-12  inf=    1  time= 0:01
  60  it =     6  nf =      33  nj =     20  F = 0.4D-11  inf=    1  time= 0:02
  61  it =    20  nf =     501  nj =    501  F = 0.1D-05  inf=    5  time= 2:39
  62  it =   501  nf =      27  nj =     15  F = 0.2D-14  inf=    1  time= 0:01
  63  it =    15  nf =       5  nj =      5  F = 0.1D-09  inf=    1  time= 0:01
  64  it =     5  nf =       4  nj =      4  F = 0.3D-14  inf=    1  time= 0:00
-------------------------------------------------------------------------------
Total  it =  1756  nf =    5088  nj =  1756       succesful =  59    time= 4:40
```

```
Test for subroutine dafne:    100  variables
------------------------------------------------------------------------------
   1  it =    8  nf =     15  nj =    11  F = 0.4D-08  inf=   0  time= 0:00
   2  it =  264  nf =    280  nj =   272  F = 0.1D+00  inf=   1  time= 0:10
   3  it =    4  nf =      9  nj =     6  F = 0.5D-12  inf=   0  time= 0:00
   4  it =    7  nf =     12  nj =     9  F = 0.3D-11  inf=   0  time= 0:00
   5  it =  139  nf =    154  nj =   146  F = 0.2D-10  inf=   0  time= 0:05
   6  it =   16  nf =     25  nj =    20  F = 0.3D-08  inf=   0  time= 0:01
   7  it =   14  nf =     21  nj =    17  F = 0.2D-12  inf=   0  time= 0:00
   8  it =   22  nf =     31  nj =    26  F = 0.3D-12  inf=   0  time= 0:01
   9  it =   15  nf =     22  nj =    18  F = 0.1D-10  inf=   0  time= 0:00
  10  it =    6  nf =     11  nj =     8  F = 0.7D-15  inf=   0  time= 0:01
  11  it =   12  nf =     19  nj =    15  F = 0.0D+00  inf=   0  time= 0:00
  12  it =   16  nf =     25  nj =    20  F = 0.3D-08  inf=   0  time= 0:01
  13  it =   15  nf =     22  nj =    18  F = 0.4D-08  inf=   0  time= 0:00
  14  it =    4  nf =      9  nj =     6  F = 0.7D-09  inf=   0  time= 0:00
  15  it =    5  nf =     10  nj =     7  F = 0.1D-08  inf=   0  time= 0:00
  16  it =   13  nf =     20  nj =    16  F = 0.2D-11  inf=   0  time= 0:01
  17  it =   14  nf =     21  nj =    17  F = 0.7D-13  inf=   0  time= 0:00
  18  it =  187  nf =    203  nj =   195  F = 0.8D+05  inf=   1  time= 0:07
  19  it =    6  nf =     11  nj =     8  F = 0.5D-12  inf=   0  time= 0:00
  20  it =   18  nf =     27  nj =    22  F = 0.7D-08  inf=   0  time= 0:01
  21  it =   12  nf =     19  nj =    15  F = 0.2D-08  inf=   0  time= 0:00
  22  it =  200  nf =    216  nj =   208  F = 0.1D+00  inf=   1  time= 0:07
  23  it =   61  nf =     72  nj =    66  F = 0.9D-08  inf=   0  time= 0:02
  24  it =  260  nf =    276  nj =   268  F = 0.2D-03  inf=   1  time= 0:10
  25  it =    5  nf =     10  nj =     7  F = 0.2D-12  inf=   0  time= 0:00
  26  it =    9  nf =     16  nj =    12  F = 0.2D-09  inf=   0  time= 0:00
  27  it =    9  nf =     16  nj =    12  F = 0.6D-13  inf=   0  time= 0:00
  28  it =    9  nf =     16  nj =    12  F = 0.5D-12  inf=   0  time= 0:01
  29  it =   14  nf =     21  nj =    17  F = 0.5D-08  inf=   0  time= 0:00
  30  it =   12  nf =     19  nj =    15  F = 0.1D-13  inf=   0  time= 0:01
  31  it =   15  nf =     22  nj =    18  F = 0.1D-10  inf=   0  time= 0:00
  32               failed due to invalid operation
  33  it =   84  nf =     97  nj =    90  F = 0.4D-08  inf=   0  time= 0:03
  34  it =    5  nf =     10  nj =     7  F = 0.4D-12  inf=   0  time= 0:00
  35  it =    5  nf =     10  nj =     7  F = 0.5D-08  inf=   0  time= 0:01
  36  it =    4  nf =      9  nj =     6  F = 0.3D-08  inf=   0  time= 0:00
  37  it =    5  nf =     10  nj =     7  F = 0.1D-12  inf=   0  time= 0:00
  38  it =    6  nf =     11  nj =     8  F = 0.1D-10  inf=   0  time= 0:00
  39  it =    6  nf =     11  nj =     8  F = 0.7D-11  inf=   0  time= 0:00
  40  it =    4  nf =      9  nj =     6  F = 0.3D-11  inf=   0  time= 0:00
  41  it =    4  nf =      9  nj =     6  F = 0.1D-10  inf=   0  time= 0:01
  42  it =    5  nf =     10  nj =     7  F = 0.1D-10  inf=   0  time= 0:00
  43  it =    6  nf =     11  nj =     8  F = 0.3D-11  inf=   0  time= 0:00
  44  it =    5  nf =     10  nj =     7  F = 0.1D-07  inf=   0  time= 0:00
  45  it =    4  nf =      9  nj =     6  F = 0.6D-14  inf=   0  time= 0:00
  46  it =   10  nf =     17  nj =    13  F = 0.4D-08  inf=   0  time= 0:01
  47  it =   22  nf =     31  nj =    26  F = 0.4D-10  inf=   0  time= 0:01
  48  it =    4  nf =      9  nj =     6  F = 0.3D-08  inf=   0  time= 0:01
  49  it =    3  nf =      6  nj =     4  F = 0.2D-10  inf=   0  time= 0:00
  50  it =    4  nf =      9  nj =     6  F = 0.4D-11  inf=   0  time= 0:00
  51  it =   12  nf =     19  nj =    15  F = 0.2D-08  inf=   0  time= 0:00
  52  it =    7  nf =     12  nj =     9  F = 0.4D-11  inf=   0  time= 0:01
  53  it =    5  nf =     10  nj =     7  F = 0.1D-14  inf=   0  time= 0:00
  54  it =   12  nf =     19  nj =    15  F = 0.6D-10  inf=   0  time= 0:00
  55  it =    5  nf =     10  nj =     7  F = 0.9D-09  inf=   0  time= 0:00
  56  it =    5  nf =     10  nj =     7  F = 0.3D-14  inf=   0  time= 0:01
  57  it =    4  nf =      9  nj =     6  F = 0.6D-08  inf=   0  time= 0:00
  58  it =  139  nf =    154  nj =   146  F = 0.2D-10  inf=   0  time= 0:05
  59  it =    6  nf =     11  nj =     8  F = 0.7D-15  inf=   0  time= 0:00
  60  it =   25  nf =     34  nj =    29  F = 0.3D-10  inf=   0  time= 0:01
  61  it =    7  nf =     12  nj =     9  F = 0.8D-08  inf=   0  time= 0:00
  62  it =    4  nf =      9  nj =     6  F = 0.3D-08  inf=   0  time= 0:00
  63  it =    5  nf =     10  nj =     7  F = 0.5D-08  inf=   0  time= 0:00
  64  it =    4  nf =      9  nj =     6  F = 0.6D-14  inf=   0  time= 0:01
------------------------------------------------------------------------------
Total  it = 1817  nf =   2266  nj =  2012      succesful =  59    time= 1:06
```

```
Test for subroutine dafne:    200  variables
------------------------------------------------------------------------------
   1  it =     9  nf =      16  nj =    12  F = 0.4D-12  inf=    0  time= 0:03
   2  it =    18  nf =      27  nj =    22  F = 0.2D-11  inf=    0  time= 0:05
   3  it =     4  nf =       9  nj =     6  F = 0.6D-12  inf=    0  time= 0:01
   4  it =     7  nf =      12  nj =     9  F = 0.3D-11  inf=    0  time= 0:02
   5  it =   271  nf =     287  nj =   279  F = 0.7D+01  inf=    1  time= 1:20
   6  it =    16  nf =      25  nj =    20  F = 0.3D-08  inf=    0  time= 0:04
   7  it =    14  nf =      21  nj =    17  F = 0.2D-12  inf=    0  time= 0:05
   8  it =    22  nf =      31  nj =    26  F = 0.2D-13  inf=    0  time= 0:06
   9  it =    15  nf =      22  nj =    18  F = 0.1D-10  inf=    0  time= 0:05
  10  it =     6  nf =      11  nj =     8  F = 0.1D-13  inf=    0  time= 0:02
  11  it =    12  nf =      19  nj =    15  F = 0.0D+00  inf=    0  time= 0:04
  12  it =    16  nf =      25  nj =    20  F = 0.3D-08  inf=    0  time= 0:05
  13  it =    15  nf =      22  nj =    18  F = 0.4D-08  inf=    0  time= 0:04
  14  it =     4  nf =       9  nj =     6  F = 0.7D-09  inf=    0  time= 0:01
  15  it =     5  nf =      10  nj =     7  F = 0.1D-08  inf=    0  time= 0:02
  16  it =    13  nf =      20  nj =    16  F = 0.2D-11  inf=    0  time= 0:04
  17  it =    14  nf =      21  nj =    17  F = 0.9D-13  inf=    0  time= 0:04
  18  it =   198  nf =     214  nj =   206  F = 0.1D+05  inf=    1  time= 1:01
  19  it =     6  nf =      11  nj =     8  F = 0.2D-09  inf=    0  time= 0:02
  20  it =    22  nf =      31  nj =    26  F = 0.2D-08  inf=    0  time= 0:07
  21  it =    12  nf =      19  nj =    15  F = 0.6D-09  inf=    0  time= 0:04
  22  it =   199  nf =     215  nj =   207  F = 0.2D-01  inf=    1  time= 1:01
  23  it =    59  nf =      70  nj =    64  F = 0.4D-08  inf=    0  time= 0:18
  24  it =    10  nf =      17  nj =    13  F = 0.2D-10  inf=    0  time= 0:03
  25  it =     5  nf =      10  nj =     7  F = 0.3D-12  inf=    0  time= 0:01
  26  it =    10  nf =      17  nj =    13  F = 0.1D-12  inf=    0  time= 0:03
  27  it =     9  nf =      16  nj =    12  F = 0.4D-11  inf=    0  time= 0:02
  28  it =     9  nf =      16  nj =    12  F = 0.1D-10  inf=    0  time= 0:03
  29  it =    14  nf =      21  nj =    17  F = 0.4D-08  inf=    0  time= 0:04
  30  it =    13  nf =      20  nj =    16  F = 0.1D-11  inf=    0  time= 0:03
  31  it =    15  nf =      22  nj =    18  F = 0.5D-08  inf=    0  time= 0:05
  32             failed due to invalid operation
  33  it =   261  nf =     277  nj =   269  F = 0.3D+01  inf=    1  time= 1:20
  34  it =     5  nf =      10  nj =     7  F = 0.4D-12  inf=    0  time= 0:02
  35  it =     6  nf =      11  nj =     8  F = 0.3D-11  inf=    0  time= 0:02
  36  it =     4  nf =       9  nj =     6  F = 0.3D-08  inf=    0  time= 0:01
  37  it =     5  nf =      10  nj =     7  F = 0.1D-12  inf=    0  time= 0:01
  38  it =     6  nf =      11  nj =     8  F = 0.2D-08  inf=    0  time= 0:02
  39  it =     6  nf =      11  nj =     8  F = 0.7D-11  inf=    0  time= 0:02
  40  it =     4  nf =       9  nj =     6  F = 0.3D-11  inf=    0  time= 0:01
  41  it =     4  nf =       9  nj =     6  F = 0.1D-10  inf=    0  time= 0:02
  42  it =     5  nf =      10  nj =     7  F = 0.1D-10  inf=    0  time= 0:01
  43  it =     6  nf =      11  nj =     8  F = 0.2D-08  inf=    0  time= 0:02
  44  it =     5  nf =      10  nj =     7  F = 0.1D-07  inf=    0  time= 0:01
  45  it =     4  nf =       9  nj =     6  F = 0.6D-14  inf=    0  time= 0:02
  46  it =    11  nf =      18  nj =    14  F = 0.3D-08  inf=    0  time= 0:03
  47  it =   273  nf =     289  nj =   281  F = 0.2D+12  inf=    1  time= 1:37
  48  it =     4  nf =       9  nj =     6  F = 0.3D-08  inf=    0  time= 0:01
  49  it =     4  nf =       9  nj =     6  F = 0.2D-09  inf=    0  time= 0:02
  50  it =     4  nf =       9  nj =     6  F = 0.4D-11  inf=    0  time= 0:01
  51  it =    12  nf =      19  nj =    15  F = 0.6D-09  inf=    0  time= 0:04
  52  it =     6  nf =      11  nj =     8  F = 0.7D-08  inf=    0  time= 0:02
  53  it =     5  nf =      10  nj =     7  F = 0.1D-14  inf=    0  time= 0:02
  54  it =    13  nf =      20  nj =    16  F = 0.2D-12  inf=    0  time= 0:04
  55  it =     6  nf =      11  nj =     8  F = 0.2D-11  inf=    0  time= 0:01
  56  it =     5  nf =      10  nj =     7  F = 0.1D-07  inf=    0  time= 0:02
  57  it =     5  nf =      10  nj =     7  F = 0.1D-07  inf=    0  time= 0:02
  58  it =   271  nf =     287  nj =   279  F = 0.7D+01  inf=    1  time= 1:19
  59  it =     6  nf =      11  nj =     8  F = 0.9D-15  inf=    0  time= 0:01
  60  it =    28  nf =      37  nj =    32  F = 0.2D-14  inf=    0  time= 0:09
  61  it =     7  nf =      12  nj =     9  F = 0.3D-08  inf=    0  time= 0:03
  62  it =     4  nf =       9  nj =     6  F = 0.3D-08  inf=    0  time= 0:01
  63  it =     6  nf =      11  nj =     8  F = 0.3D-11  inf=    0  time= 0:02
  64  it =     4  nf =       9  nj =     6  F = 0.6D-14  inf=    0  time= 0:01
------------------------------------------------------------------------------
Total  it =  2037  nf =    2484  nj =  2232       succesful =  57    time=10:30
```

```
Test for subroutine brent    100  variables
-------------------------------------------------------------------------------
   1  it =    4  nf =    206  nj =     0  F = 0.4D+03  inf=    7  time= 0:00
   2  it =    4  nf =    212  nj =     0  F = 0.1D-08  inf=    1  time= 0:00
   3  it =    8  nf =    412  nj =     0  F = 0.2D-07  inf=    6  time= 0:00
   4  it =   14  nf =    727  nj =     0  F = 0.3D-09  inf=    1  time= 0:01
   5          failed due to invalid operation
   6  it =   11  nf =    632  nj =     0  F = 0.1D-07  inf=    1  time= 0:00
   7  it =   11  nf =    566  nj =     0  F = 0.2D+13  inf=    6  time= 0:00
   8  it =    4  nf =    206  nj =     0  F = 0.3D+06  inf=    7  time= 0:00
   9  it =    8  nf =    412  nj =     0  F = 0.3D+10  inf=    6  time= 0:00
  10  it =    5  nf =    261  nj =     0  F = 0.1D-09  inf=    1  time= 0:00
  11  it =   10  nf =    518  nj =     0  F = 0.2D-08  inf=    1  time= 0:01
  12  it =   19  nf =    978  nj =     0  F = 0.3D-08  inf=    1  time= 0:00
  13  it =   19  nf =   1132  nj =     0  F = 0.9D-08  inf=    1  time= 0:01
  14  it =    6  nf =    309  nj =     0  F = 0.3D+01  inf=    6  time= 0:00
  15  it =    4  nf =    209  nj =     0  F = 0.3D-08  inf=    1  time= 0:00
  16  it =    9  nf =    479  nj =     0  F = 0.7D-08  inf=    1  time= 0:00
  17  it =   13  nf =    672  nj =     0  F = 0.7D+04  inf=    6  time= 0:00
  18  it =    7  nf =    360  nj =     0  F = 0.3D+02  inf=    6  time= 0:00
  19  it =    2  nf =    105  nj =     0  F = 0.2D-08  inf=    1  time= 0:00
  20  it =    6  nf =    309  nj =     0  F = 0.1D+04  inf=    6  time= 0:01
  21  it =   15  nf =    781  nj =     0  F = 0.4D-08  inf=    1  time= 0:00
  22  it =    4  nf =    206  nj =     0  F = 0.2D+06  inf=    7  time= 0:00
  23  it =    4  nf =    206  nj =     0  F = 0.1D+03  inf=    7  time= 0:00
  24  it =   21  nf =   1091  nj =     0  F = 0.9D+01  inf=    6  time= 0:01
  25  it =    3  nf =    157  nj =     0  F = 0.4D-09  inf=    1  time= 0:00
  26  it =    4  nf =    220  nj =     0  F = 0.7D-08  inf=    1  time= 0:00
  27  it =   12  nf =    645  nj =     0  F = 0.6D-08  inf=    1  time= 0:00
  28  it =    6  nf =    309  nj =     0  F = 0.1D+03  inf=    6  time= 0:00
  29  it =    3  nf =    156  nj =     0  F = 0.1D-12  inf=    3  time= 0:00
  30  it =   16  nf =    824  nj =     0  F = 0.4D+04  inf=    6  time= 0:01
  31  it =   10  nf =    537  nj =     0  F = 0.3D-10  inf=    3  time= 0:00
  32          failed due to invalid operation
  33  it =  148  nf =   7699  nj =     0  F = 0.8D-08  inf=    1  time= 0:03
  34  it =    5  nf =    257  nj =     0  F = 0.2D-08  inf=    1  time= 0:00
  35  it =    2  nf =    106  nj =     0  F = 0.6D-09  inf=    1  time= 0:00
  36  it =    2  nf =    104  nj =     0  F = 0.4D-14  inf=    3  time= 0:00
  37  it =    3  nf =    157  nj =     0  F = 0.1D-10  inf=    1  time= 0:00
  38  it =    2  nf =    105  nj =     0  F = 0.8D-11  inf=    1  time= 0:00
  39  it =    6  nf =    309  nj =     0  F = 0.6D+01  inf=    6  time= 0:00
  40  it =    2  nf =    109  nj =     0  F = 0.5D-08  inf=    1  time= 0:00
  41          failed due to invalid operation
  42  it =    2  nf =    103  nj =     0  F = 0.0D+00  inf=    3  time= 0:01
  43  it =    3  nf =    155  nj =     0  F = 0.1D-08  inf=    1  time= 0:00
  44  it =    4  nf =    210  nj =     0  F = 0.3D-09  inf=    1  time= 0:00
  45  it =    2  nf =    105  nj =     0  F = 0.9D-12  inf=    1  time= 0:00
  46  it =   10  nf =    518  nj =     0  F = 0.7D-09  inf=    1  time= 0:01
  47  it =    6  nf =    309  nj =     0  F = 0.4D+07  inf=    6  time= 0:00
  48  it =    3  nf =    158  nj =     0  F = 0.6D-08  inf=    1  time= 0:00
  49  it =    2  nf =    105  nj =     0  F = 0.4D-08  inf=    3  time= 0:02
  50  it =    2  nf =    105  nj =     0  F = 0.2D-09  inf=    1  time= 0:00
  51  it =   15  nf =    781  nj =     0  F = 0.4D-08  inf=    1  time= 0:00
  52  it =    4  nf =    208  nj =     0  F = 0.1D-09  inf=    1  time= 0:00
  53  it =    3  nf =    156  nj =     0  F = 0.3D-10  inf=    1  time= 0:00
  54  it =   94  nf =   5767  nj =     0  F = 0.1D-11  inf=    3  time= 0:03
  55  it =    2  nf =    105  nj =     0  F = 0.8D-09  inf=    1  time= 0:00
  56  it =    4  nf =    207  nj =     0  F = 0.6D-12  inf=    1  time= 0:00
  57  it =    4  nf =    210  nj =     0  F = 0.1D-09  inf=    1  time= 0:00
  58          failed due to invalid operation
  59  it =    3  nf =    157  nj =     0  F = 0.2D-09  inf=    1  time= 0:00
  60  it =    6  nf =    309  nj =     0  F = 0.3D+12  inf=    6  time= 0:00
  61  it =    4  nf =    206  nj =     0  F = 0.2D+13  inf=    7  time= 0:01
  62  it =    3  nf =    155  nj =     0  F = 0.2D-14  inf=    3  time= 0:00
  63  it =    2  nf =    106  nj =     0  F = 0.7D-09  inf=    1  time= 0:00
  64  it =    2  nf =    105  nj =     0  F = 0.9D-12  inf=    1  time= 0:01
-------------------------------------------------------------------------------
Total  it =  612  nf =  32923  nj =     0       succesful =  42    time= 0:18
```

```
Test for subroutine brent    200  variables
------------------------------------------------------------------------------
    1  it =    25  nf =    2537  nj =     0  F = 0.2D+05  inf=    6  time= 0:04
    2  it =     4  nf =     412  nj =     0  F = 0.1D-08  inf=    1  time= 0:01
    3  it =     8  nf =     812  nj =     0  F = 0.4D-07  inf=    6  time= 0:01
    4  it =    14  nf =    1427  nj =     0  F = 0.3D-09  inf=    1  time= 0:03
    5              failed due to invalid operation
    6  it =     9  nf =    1020  nj =     0  F = 0.1D-07  inf=    1  time= 0:02
    7  it =    11  nf =    1116  nj =     0  F = 0.2D+13  inf=    6  time= 0:02
    8  it =    13  nf =    1319  nj =     0  F = 0.3D+11  inf=    7  time= 0:03
    9  it =    32  nf =    3248  nj =     0  F = 0.5D+18  inf=    6  time= 0:06
   10  it =     5  nf =     511  nj =     0  F = 0.9D-09  inf=    1  time= 0:01
   11  it =    10  nf =    1018  nj =     0  F = 0.2D-08  inf=    1  time= 0:01
   12  it =    19  nf =    1928  nj =     0  F = 0.3D-08  inf=    1  time= 0:04
   13  it =    15  nf =    1738  nj =     0  F = 0.1D-07  inf=    1  time= 0:03
   14  it =     6  nf =     609  nj =     0  F = 0.3D+01  inf=    6  time= 0:01
   15  it =     4  nf =     409  nj =     0  F = 0.3D-08  inf=    1  time= 0:01
   16  it =     9  nf =     929  nj =     0  F = 0.7D-08  inf=    1  time= 0:02
   17  it =    13  nf =    1322  nj =     0  F = 0.7D+04  inf=    6  time= 0:02
   18  it =    15  nf =    1522  nj =     0  F = 0.9D+02  inf=    6  time= 0:03
   19  it =     2  nf =     205  nj =     0  F = 0.2D-08  inf=    1  time= 0:01
   20  it =     6  nf =     609  nj =     0  F = 0.2D+03  inf=    7  time= 0:01
   21  it =    16  nf =    1635  nj =     0  F = 0.9D-08  inf=    1  time= 0:03
   22  it =     4  nf =     406  nj =     0  F = 0.1D+05  inf=    7  time= 0:01
   23  it =     8  nf =     812  nj =     0  F = 0.1D+02  inf=    7  time= 0:01
   24  it =     7  nf =     731  nj =     0  F = 0.1D-09  inf=    1  time= 0:02
   25  it =     4  nf =     399  nj =     0  F = 0.5D-08  inf=    1  time= 0:00
   26  it =     4  nf =     415  nj =     0  F = 0.6D-08  inf=    1  time= 0:01
   27  it =    12  nf =    1258  nj =     0  F = 0.7D-08  inf=    1  time= 0:02
   28  it =     4  nf =     398  nj =     0  F = 0.2D+02  inf=    7  time= 0:01
   29  it =     3  nf =     300  nj =     0  F = 0.1D-11  inf=    3  time= 0:01
   30  it =     6  nf =     597  nj =     0  F = 0.3D+04  inf=    6  time= 0:01
   31  it =     4  nf =     406  nj =     0  F = 0.6D+06  inf=    7  time= 0:01
   32              failed due to invalid operation
   33  it =    89  nf =    9033  nj =     0  F = 0.2D+02  inf=    4  time= 0:16
   34  it =     5  nf =     507  nj =     0  F = 0.2D-08  inf=    1  time= 0:01
   35  it =    11  nf =    1153  nj =     0  F = 0.5D-09  inf=    1  time= 0:03
   36  it =     2  nf =     204  nj =     0  F = 0.4D-14  inf=    3  time= 0:00
   37  it =     3  nf =     307  nj =     0  F = 0.1D-10  inf=    1  time= 0:01
   38  it =     2  nf =     205  nj =     0  F = 0.1D-10  inf=    1  time= 0:00
   39  it =     6  nf =     609  nj =     0  F = 0.6D+01  inf=    6  time= 0:02
   40  it =     2  nf =     209  nj =     0  F = 0.5D-08  inf=    1  time= 0:00
   41              failed due to invalid operation
   42  it =     2  nf =     203  nj =     0  F = 0.0D+00  inf=    3  time= 0:00
   43  it =     3  nf =     305  nj =     0  F = 0.1D-08  inf=    1  time= 0:01
   44  it =     4  nf =     410  nj =     0  F = 0.3D-09  inf=    1  time= 0:01
   45  it =     2  nf =     205  nj =     0  F = 0.8D-12  inf=    1  time= 0:00
   46  it =     6  nf =     609  nj =     0  F = 0.5D+03  inf=    6  time= 0:07
   47  it =    17  nf =    1726  nj =     0  F = 0.5D+09  inf=    6  time= 0:04
   48  it =     3  nf =     308  nj =     0  F = 0.6D-08  inf=    1  time= 0:01
   49  it =     2  nf =     206  nj =     0  F = 0.1D-08  inf=    3  time= 0:09
   50  it =     2  nf =     205  nj =     0  F = 0.2D-09  inf=    1  time= 0:01
   51  it =    16  nf =    1635  nj =     0  F = 0.9D-08  inf=    1  time= 0:03
   52  it =     3  nf =     308  nj =     0  F = 0.1D-09  inf=    1  time= 0:01
   53  it =     3  nf =     306  nj =     0  F = 0.2D-10  inf=    1  time= 0:02
   54  it =    31  nf =    3398  nj =     0  F = 0.4D+47  inf=    6  time= 0:07
   55  it =     2  nf =     205  nj =     0  F = 0.9D-09  inf=    1  time= 0:00
   56  it =     5  nf =     507  nj =     0  F = 0.2D-11  inf=    1  time= 0:01
   57  it =     6  nf =     609  nj =     0  F = 0.1D-06  inf=    6  time= 0:01
   58              failed due to invalid operation
   59  it =     3  nf =     307  nj =     0  F = 0.2D-09  inf=    1  time= 0:02
   60  it =     6  nf =     609  nj =     0  F = 0.3D+12  inf=    6  time= 0:01
   61  it =     4  nf =     406  nj =     0  F = 0.2D+13  inf=    7  time= 0:08
   62  it =     3  nf =     305  nj =     0  F = 0.2D-14  inf=    3  time= 0:01
   63  it =     9  nf =     951  nj =     0  F = 0.7D-09  inf=    1  time= 0:02
   64  it =     2  nf =     205  nj =     0  F = 0.8D-12  inf=    1  time= 0:01
------------------------------------------------------------------------------
Total  it =   546  nf =   56203  nj =     0       succesful =  38    time= 2:13
```

Test for subroutine brent 500 variables

1	it =	5	nf =	1257	nj =	0	F =	0.4D+01	inf=	7	time=	0:16
2	it =	4	nf =	1012	nj =	0	F =	0.1D-08	inf=	1	time=	0:14
3	it =	8	nf =	2012	nj =	0	F =	0.5D-07	inf=	6	time=	0:25
4	it =	14	nf =	3527	nj =	0	F =	0.3D-09	inf=	1	time=	0:51
5	deleted from this test (invalid operation supposed)											
6	it =	9	nf =	2416	nj =	0	F =	0.9D-08	inf=	1	time=	0:32
7	it =	11	nf =	2766	nj =	0	F =	0.2D+13	inf=	6	time=	0:38
8	it =	4	nf =	1006	nj =	0	F =	0.2D+06	inf=	7	time=	0:14
9	it =	12	nf =	3018	nj =	0	F =	0.3D+10	inf=	6	time=	0:40
10	it =	5	nf =	1261	nj =	0	F =	0.4D-08	inf=	1	time=	0:17
11	it =	10	nf =	2518	nj =	0	F =	0.2D-08	inf=	1	time=	0:35
12	it =	19	nf =	4778	nj =	0	F =	0.3D-08	inf=	1	time=	1:05
13	it =	13	nf =	3617	nj =	0	F =	0.1D-07	inf=	1	time=	0:45
14	it =	6	nf =	1509	nj =	0	F =	0.3D+01	inf=	6	time=	0:19
15	it =	4	nf =	1009	nj =	0	F =	0.3D-08	inf=	1	time=	0:14
16	it =	9	nf =	2279	nj =	0	F =	0.7D-08	inf=	1	time=	0:31
17	it =	13	nf =	3272	nj =	0	F =	0.7D+04	inf=	6	time=	0:44
18	it =	11	nf =	2766	nj =	0	F =	0.6D+01	inf=	6	time=	0:37
19	it =	2	nf =	505	nj =	0	F =	0.4D-08	inf=	1	time=	0:07
20	it =	5	nf =	1257	nj =	0	F =	0.2D+06	inf=	7	time=	0:17
21	it =	18	nf =	4537	nj =	0	F =	0.2D-08	inf=	1	time=	1:02
22	it =	4	nf =	1006	nj =	0	F =	0.1D+06	inf=	7	time=	0:14
23	it =	4	nf =	1006	nj =	0	F =	0.2D+03	inf=	7	time=	0:14
24	it =	5	nf =	1245	nj =	0	F =	0.6D-08	inf=	1	time=	0:16
25	it =	4	nf =	976	nj =	0	F =	0.9D-11	inf=	1	time=	0:12
26	it =	4	nf =	986	nj =	0	F =	0.6D-08	inf=	1	time=	0:12
27	it =	15	nf =	3795	nj =	0	F =	0.5D-12	inf=	1	time=	0:46
28	it =	4	nf =	974	nj =	0	F =	0.9D+01	inf=	7	time=	0:12
29	it =	3	nf =	733	nj =	0	F =	0.2D-08	inf=	1	time=	0:09
30	it =	6	nf =	1461	nj =	0	F =	0.4D+03	inf=	6	time=	0:18
31	it =	7	nf =	1785	nj =	0	F =	0.5D-08	inf=	1	time=	0:25
32	deleted from this test (invalid operation supposed)											
33	it =	36	nf =	9054	nj =	0	F =	0.2D+02	inf=	4	time=	2:01
34	it =	5	nf =	1257	nj =	0	F =	0.2D-08	inf=	1	time=	0:17
35	it =	8	nf =	2087	nj =	0	F =	0.8D-09	inf=	1	time=	0:32
36	it =	2	nf =	504	nj =	0	F =	0.4D-14	inf=	3	time=	0:07
37	it =	3	nf =	757	nj =	0	F =	0.9D-11	inf=	1	time=	0:12
38	it =	2	nf =	505	nj =	0	F =	0.2D-11	inf=	1	time=	0:07
39	it =	6	nf =	1509	nj =	0	F =	0.6D+01	inf=	6	time=	0:20
40	it =	2	nf =	509	nj =	0	F =	0.5D-08	inf=	1	time=	0:07
41	deleted from this test (invalid operation supposed)											
42	it =	2	nf =	503	nj =	0	F =	0.0D+00	inf=	3	time=	0:07
43	it =	3	nf =	755	nj =	0	F =	0.4D-08	inf=	1	time=	0:10
44	it =	4	nf =	1010	nj =	0	F =	0.3D-09	inf=	1	time=	0:14
45	it =	2	nf =	505	nj =	0	F =	0.8D-12	inf=	1	time=	0:10
46	it =	6	nf =	1509	nj =	0	F =	0.1D+04	inf=	6	time=	1:48
47	it =	32	nf =	8160	nj =	0	F =	0.1D+09	inf=	6	time=	2:20
48	it =	3	nf =	758	nj =	0	F =	0.6D-08	inf=	1	time=	0:10
49	it =	2	nf =	506	nj =	0	F =	0.2D-07	inf=	2	time=	2:19
50	it =	2	nf =	505	nj =	0	F =	0.2D-09	inf=	1	time=	0:20
51	it =	18	nf =	4537	nj =	0	F =	0.2D-08	inf=	1	time=	1:02
52	it =	3	nf =	756	nj =	0	F =	0.9D-09	inf=	1	time=	0:10
53	it =	3	nf =	756	nj =	0	F =	0.2D-10	inf=	1	time=	0:39
54	it =	6	nf =	1509	nj =	0	F =	0.6D+43	inf=	6	time=	0:21
55	it =	2	nf =	505	nj =	0	F =	0.8D-09	inf=	1	time=	0:07
56	it =	5	nf =	1257	nj =	0	F =	0.1D-10	inf=	1	time=	0:17
57	it =	6	nf =	1509	nj =	0	F =	0.3D-05	inf=	6	time=	0:21
58	deleted from this test (invalid operation supposed)											
59	it =	3	nf =	757	nj =	0	F =	0.2D-09	inf=	1	time=	0:25
60	it =	6	nf =	1509	nj =	0	F =	0.3D+12	inf=	6	time=	0:21
61	it =	4	nf =	1006	nj =	0	F =	0.9D+12	inf=	7	time=	3:32
62	it =	3	nf =	755	nj =	0	F =	0.2D-14	inf=	3	time=	0:11
63	it =	7	nf =	1834	nj =	0	F =	0.2D-08	inf=	1	time=	0:28
64	it =	2	nf =	505	nj =	0	F =	0.8D-12	inf=	1	time=	0:16
Total	it =	426	nf =	107877	nj =	0			succesful =	38	time=	32:52

```
Test for subroutine ns02ad:    100  variables
-----------------------------------------------------------------------------
   1  it =   228  nf =     329  nj =     0  F = 0.2D-08  inf=    0  time= 0:01
   2  it =   216  nf =     317  nj =     0  F = 0.2D-08  inf=    0  time= 0:01
   3  it =     6  nf =     107  nj =     0  F = 0.2D-08  inf=    0  time= 0:00
   4  it =   155  nf =     354  nj =     0  F = 0.2D-09  inf=    0  time= 0:00
   5  it =  3900  nf =    4000  nj =     0  F = 0.5D+01  inf=    3  time= 0:11
   6  it =  1240  nf =    1341  nj =     0  F = 0.1D-08  inf=    0  time= 0:04
   7  it =  1021  nf =    1122  nj =     0  F = 0.4D-09  inf=    0  time= 0:03
   8  it =   211  nf =     318  nj =     0  F = 0.2D-08  inf=    0  time= 0:01
   9  it =   202  nf =     580  nj =     0  F = 0.2D-08  inf=    0  time= 0:01
  10  it =    20  nf =     121  nj =     0  F = 0.7D-09  inf=    0  time= 0:00
  11  it =   615  nf =     794  nj =     0  F = 0.3D-08  inf=    0  time= 0:02
  12  it =   275  nf =     376  nj =     0  F = 0.1D-08  inf=    0  time= 0:00
  13  it =  1327  nf =    1527  nj =     0  F = 0.3D-08  inf=    0  time= 0:05
  14  it =    13  nf =     114  nj =     0  F = 0.1D-08  inf=    0  time= 0:00
  15  it =    71  nf =     178  nj =     0  F = 0.3D-08  inf=    0  time= 0:00
  16  it =  1267  nf =    1373  nj =     0  F = 0.6D-08  inf=    0  time= 0:04
  17  it =  3312  nf =    3413  nj =     0  F = 0.6D-08  inf=    0  time= 0:10
  18  it =   422  nf =     524  nj =     0  F = 0.7D-09  inf=    0  time= 0:01
  19  it =    16  nf =     117  nj =     0  F = 0.2D-08  inf=    0  time= 0:00
  20  it =   222  nf =     323  nj =     0  F = 0.5D-08  inf=    0  time= 0:01
  21  it =   665  nf =     766  nj =     0  F = 0.5D-08  inf=    0  time= 0:02
  22  it =  3899  nf =    4000  nj =     0  F = 0.3D+00  inf=    3  time= 0:12
  23  it =   417  nf =     518  nj =     0  F = 0.4D-08  inf=    0  time= 0:01
  24  it =  1616  nf =    1717  nj =     0  F = 0.2D-03  inf=    1  time= 0:05
  25  it =     8  nf =     109  nj =     0  F = 0.5D-09  inf=    0  time= 0:00
  26  it =    29  nf =     130  nj =     0  F = 0.2D-08  inf=    0  time= 0:00
  27  it =   235  nf =     336  nj =     0  F = 0.2D-08  inf=    0  time= 0:01
  28  it =   217  nf =     318  nj =     0  F = 0.2D-08  inf=    0  time= 0:00
  29  it =    12  nf =     113  nj =     0  F = 0.2D-09  inf=    0  time= 0:00
  30  it =   301  nf =     403  nj =     0  F = 0.2D-08  inf=    0  time= 0:01
  31  it =     1  nf =     101  nj =     0  F = 0.5D+05  inf=    4  time= 0:00
  32            failed due to invalid operation
  33  it =  3899  nf =    4000  nj =     0  F = 0.1D+01  inf=    3  time= 0:12
  34  it =     6  nf =     107  nj =     0  F = 0.2D-11  inf=    0  time= 0:00
  35  it =   215  nf =     316  nj =     0  F = 0.6D-04  inf=    1  time= 0:01
  36  it =    27  nf =     128  nj =     0  F = 0.1D-12  inf=    0  time= 0:00
  37  it =     7  nf =     108  nj =     0  F = 0.3D-13  inf=    0  time= 0:00
  38  it =    17  nf =     118  nj =     0  F = 0.5D-09  inf=    0  time= 0:00
  39  it =    31  nf =     132  nj =     0  F = 0.5D-09  inf=    0  time= 0:00
  40  it =     9  nf =     110  nj =     0  F = 0.8D-09  inf=    0  time= 0:00
  41  it =   136  nf =     237  nj =     0  F = 0.2D-08  inf=    0  time= 0:01
  42  it =    26  nf =     127  nj =     0  F = 0.1D-08  inf=    0  time= 0:00
  43  it =     8  nf =     109  nj =     0  F = 0.3D-09  inf=    0  time= 0:00
  44  it =    22  nf =     124  nj =     0  F = 0.5D-08  inf=    0  time= 0:00
  45  it =     4  nf =     105  nj =     0  F = 0.3D-09  inf=    0  time= 0:00
  46  it =  3175  nf =    3276  nj =     0  F = 0.2D-03  inf=    1  time= 0:17
  47  it =   578  nf =     778  nj =     0  F = 0.4D-09  inf=    0  time= 0:02
  48  it =    13  nf =     114  nj =     0  F = 0.3D-09  inf=    0  time= 0:00
  49  it =     6  nf =     107  nj =     0  F = 0.1D-09  inf=    0  time= 0:01
  50  it =     5  nf =     106  nj =     0  F = 0.2D-08  inf=    0  time= 0:00
  51  it =   688  nf =     789  nj =     0  F = 0.4D-08  inf=    0  time= 0:02
  52  it =    10  nf =     111  nj =     0  F = 0.3D-10  inf=    0  time= 0:00
  53  it =     7  nf =     108  nj =     0  F = 0.3D-09  inf=    0  time= 0:01
  54  it =  1251  nf =    2150  nj =     0  F = 0.7D-08  inf=    0  time= 0:03
  55  it =    16  nf =     117  nj =     0  F = 0.8D-11  inf=    0  time= 0:00
  56  it =     8  nf =     109  nj =     0  F = 0.1D-09  inf=    0  time= 0:00
  57  it =    10  nf =     111  nj =     0  F = 0.2D-09  inf=    0  time= 0:00
  58  it =  2122  nf =    2910  nj =     0  F = 0.5D-08  inf=    0  time= 0:06
  59  it =    12  nf =     113  nj =     0  F = 0.2D-08  inf=    0  time= 0:00
  60  it =   413  nf =     514  nj =     0  F = 0.1D-08  inf=    0  time= 0:02
  61  it =  3899  nf =    4000  nj =     0  F = 0.6D-06  inf=    3  time= 0:26
  62  it =    27  nf =     128  nj =     0  F = 0.1D-12  inf=    0  time= 0:01
  63  it =   215  nf =     316  nj =     0  F = 0.6D-04  inf=    1  time= 0:00
  64  it =     4  nf =     105  nj =     0  F = 0.3D-09  inf=    0  time= 0:00
-----------------------------------------------------------------------------
Total  it = 39005  nf =   47522  nj =     0      succesful =  54    time= 2:22
```

Test for subroutine ns02ad: 200 variables

1	it = 426	nf = 627	nj = 0	F = 0.2D-08	inf= 0	time= 0:05
2	it = 480	nf = 681	nj = 0	F = 0.2D-08	inf= 0	time= 0:07
3	it = 6	nf = 207	nj = 0	F = 0.8D-09	inf= 0	time= 0:00
4	it = 208	nf = 1403	nj = 0	F = 0.4D+01	inf= 4	time= 0:04
5	it = 5800	nf = 6000	nj = 0	F = 0.5D+01	inf= 3	time= 1:07
6	it = 2080	nf = 2281	nj = 0	F = 0.2D-08	inf= 0	time= 0:27
7	it = 1804	nf = 2007	nj = 0	F = 0.3D-08	inf= 0	time= 0:23
8	it = 191	nf = 456	nj = 0	F = 0.3D-08	inf= 0	time= 0:03
9	it = 71	nf = 669	nj = 0	F = 0.3D+01	inf= 4	time= 0:02
10	it = 20	nf = 221	nj = 0	F = 0.9D-09	inf= 0	time= 0:00
11	it = 626	nf = 1043	nj = 0	F = 0.5D-08	inf= 0	time= 0:08
12	it = 487	nf = 688	nj = 0	F = 0.1D-08	inf= 0	time= 0:06
13	it = 3599	nf = 3999	nj = 0	F = 0.6D-08	inf= 0	time= 0:47
14	it = 13	nf = 214	nj = 0	F = 0.1D-08	inf= 0	time= 0:00
15	it = 74	nf = 280	nj = 0	F = 0.2D-08	inf= 0	time= 0:01
16	it = 4055	nf = 4256	nj = 0	F = 0.3D-08	inf= 0	time= 0:52
17	it = 2489	nf = 2690	nj = 0	F = 0.3D-08	inf= 0	time= 0:32
18	it = 810	nf = 1012	nj = 0	F = 0.3D-08	inf= 0	time= 0:10
19	it = 19	nf = 220	nj = 0	F = 0.3D-10	inf= 0	time= 0:01
20	it = 446	nf = 647	nj = 0	F = 0.5D-08	inf= 0	time= 0:06
21	it = 1210	nf = 1411	nj = 0	F = 0.3D-08	inf= 0	time= 0:15
22	it = 5799	nf = 6000	nj = 0	F = 0.1D+00	inf= 3	time= 1:15
23	it = 823	nf = 1024	nj = 0	F = 0.2D-08	inf= 0	time= 0:10
24	it = 19	nf = 216	nj = 0	F = 0.1D-10	inf= 0	time= 0:01
25	it = 8	nf = 205	nj = 0	F = 0.2D-08	inf= 0	time= 0:00
26	it = 29	nf = 226	nj = 0	F = 0.1D-08	inf= 0	time= 0:01
27	it = 406	nf = 603	nj = 0	F = 0.3D-08	inf= 0	time= 0:05
28	it = 172	nf = 369	nj = 0	F = 0.6D-08	inf= 0	time= 0:02
29	it = 13	nf = 210	nj = 0	F = 0.8D-10	inf= 0	time= 0:01
30	it = 482	nf = 682	nj = 0	F = 0.2D-08	inf= 0	time= 0:06
31	it = 1	nf = 201	nj = 0	F = 0.2D+05	inf= 4	time= 0:00
32	failed due to invalid operation					
33	it = 5600	nf = 6000	nj = 0	F = 0.1D+01	inf= 3	time= 1:13
34	it = 6	nf = 207	nj = 0	F = 0.2D-11	inf= 0	time= 0:00
35	it = 289	nf = 769	nj = 0	F = 0.2D-04	inf= 1	time= 0:04
36	it = 27	nf = 228	nj = 0	F = 0.1D-12	inf= 0	time= 0:01
37	it = 7	nf = 208	nj = 0	F = 0.3D-13	inf= 0	time= 0:00
38	it = 20	nf = 221	nj = 0	F = 0.3D-10	inf= 0	time= 0:01
39	it = 39	nf = 240	nj = 0	F = 0.1D-08	inf= 0	time= 0:00
40	it = 9	nf = 210	nj = 0	F = 0.9D-09	inf= 0	time= 0:01
41	it = 658	nf = 1058	nj = 0	F = 0.6D-08	inf= 1	time= 0:09
42	it = 26	nf = 227	nj = 0	F = 0.1D-08	inf= 0	time= 0:01
43	it = 9	nf = 210	nj = 0	F = 0.1D-10	inf= 0	time= 0:00
44	it = 23	nf = 227	nj = 0	F = 0.1D-08	inf= 0	time= 0:00
45	it = 4	nf = 205	nj = 0	F = 0.3D-09	inf= 0	time= 0:01
46	it = 5799	nf = 6000	nj = 0	F = 0.2D-03	inf= 3	time= 2:10
47	it = 4823	nf = 5024	nj = 0	F = 0.8D-09	inf= 0	time= 1:06
48	it = 13	nf = 214	nj = 0	F = 0.6D-09	inf= 0	time= 0:00
49	it = 6	nf = 207	nj = 0	F = 0.4D-09	inf= 0	time= 0:09
50	it = 6	nf = 207	nj = 0	F = 0.2D-10	inf= 0	time= 0:01
51	it = 1243	nf = 1444	nj = 0	F = 0.3D-08	inf= 0	time= 0:17
52	it = 10	nf = 211	nj = 0	F = 0.6D-10	inf= 0	time= 0:00
53	it = 7	nf = 208	nj = 0	F = 0.3D-09	inf= 0	time= 0:01
54	it = 215	nf = 621	nj = 0	F = 0.2D+02	inf= 1	time= 0:03
55	it = 18	nf = 219	nj = 0	F = 0.5D-11	inf= 0	time= 0:00
56	it = 734	nf = 935	nj = 0	F = 0.1D-08	inf= 0	time= 0:11
57	it = 601	nf = 802	nj = 0	F = 0.3D-08	inf= 0	time= 0:08
58	it = 3	nf = 400	nj = 0	F = 0.6D+01	inf= 4	time= 0:00
59	it = 12	nf = 213	nj = 0	F = 0.4D-08	inf= 0	time= 0:01
60	it = 5600	nf = 6000	nj = 0	F = 0.7D+00	inf= 3	time= 1:12
61	it = 5799	nf = 6000	nj = 0	F = 0.5D-03	inf= 3	time= 3:03
62	it = 27	nf = 228	nj = 0	F = 0.1D-12	inf= 0	time= 0:00
63	it = 216	nf = 623	nj = 0	F = 0.2D-04	inf= 1	time= 0:03
64	it = 4	nf = 205	nj = 0	F = 0.3D-09	inf= 0	time= 0:01
Total	it = 64519	nf = 80519	nj = 0		succesful = 50	time=16:54

Test for subroutine UFO-Newton: 100 variables

1	it =	11	nf =	13	nj =	11	F =	0.1D-09	inf=	3	time=	0:00
2	it =	27	nf =	31	nj =	27	F =	0.7D-08	inf=	3	time=	0:01
3	it =	3	nf =	4	nj =	3	F =	0.5D-09	inf=	3	time=	0:00
4	it =	15	nf =	21	nj =	15	F =	0.1D-11	inf=	3	time=	0:00
5	it =	18	nf =	21	nj =	18	F =	0.3D-13	inf=	3	time=	0:01
6	it =	17	nf =	18	nj =	17	F =	0.8D-08	inf=	3	time=	0:01
7	it =	62	nf =	69	nj =	62	F =	0.0D+00	inf=	3	time=	0:02
8	it =	18	nf =	21	nj =	18	F =	0.3D-09	inf=	3	time=	0:00
9	it =	23	nf =	26	nj =	23	F =	0.2D-13	inf=	3	time=	0:01
10	it =	8	nf =	9	nj =	8	F =	0.3D-14	inf=	3	time=	0:01
11	it =	12	nf =	13	nj =	12	F =	0.0D+00	inf=	3	time=	0:00
12	it =	17	nf =	18	nj =	17	F =	0.4D-08	inf=	3	time=	0:00
13	it =	17	nf =	18	nj =	17	F =	0.3D-08	inf=	3	time=	0:01
14	it =	6	nf =	7	nj =	6	F =	0.9D-10	inf=	3	time=	0:00
15	it =	5	nf =	6	nj =	5	F =	0.3D-10	inf=	3	time=	0:00
16	it =	52	nf =	53	nj =	52	F =	0.3D-10	inf=	3	time=	0:02
17	it =	15	nf =	18	nj =	15	F =	0.1D-08	inf=	3	time=	0:01
18	it =	15	nf =	16	nj =	15	F =	0.1D-08	inf=	3	time=	0:00
19	it =	15	nf =	16	nj =	15	F =	0.1D-10	inf=	3	time=	0:01
20	it =	12	nf =	13	nj =	12	F =	0.5D-12	inf=	3	time=	0:00
21	it =	13	nf =	14	nj =	13	F =	0.4D-14	inf=	3	time=	0:00
22	it =	9	nf =	10	nj =	9	F =	0.4D-11	inf=	3	time=	0:01
23	it =	53	nf =	59	nj =	53	F =	0.1D-09	inf=	3	time=	0:02
24	it =	48	nf =	52	nj =	48	F =	0.6D-03	inf=	2	time=	0:01
25	it =	6	nf =	7	nj =	6	F =	0.2D-14	inf=	3	time=	0:01
26	it =	12	nf =	13	nj =	12	F =	0.3D-12	inf=	3	time=	0:00
27	it =	10	nf =	11	nj =	10	F =	0.9D-11	inf=	3	time=	0:00
28	it =	11	nf =	14	nj =	11	F =	0.6D-08	inf=	3	time=	0:01
29	it =	16	nf =	17	nj =	16	F =	0.4D-08	inf=	3	time=	0:00
30	it =	10	nf =	12	nj =	10	F =	0.1D-10	inf=	3	time=	0:01
31	it =	13	nf =	15	nj =	13	F =	0.2D-10	inf=	3	time=	0:00
32	it =	38	nf =	39	nj =	38	F =	0.1D-08	inf=	3	time=	0:01
33	it =	69	nf =	70	nj =	69	F =	0.4D-08	inf=	3	time=	0:02
34	it =	5	nf =	6	nj =	5	F =	0.4D-17	inf=	3	time=	0:00
35	it =	4	nf =	5	nj =	4	F =	0.4D-09	inf=	3	time=	0:00
36	it =	19	nf =	22	nj =	19	F =	0.0D+00	inf=	3	time=	0:01
37	it =	5	nf =	6	nj =	5	F =	0.6D-11	inf=	3	time=	0:00
38	it =	16	nf =	17	nj =	16	F =	0.2D-11	inf=	3	time=	0:01
39	it =	9	nf =	10	nj =	9	F =	0.8D-14	inf=	3	time=	0:00
40	it =	5	nf =	6	nj =	5	F =	0.2D-14	inf=	3	time=	0:00
41	it =	25	nf =	31	nj =	25	F =	0.6D-12	inf=	3	time=	0:01
42	it =	5	nf =	6	nj =	5	F =	0.1D-08	inf=	3	time=	0:00
43	it =	6	nf =	7	nj =	6	F =	0.2D-09	inf=	3	time=	0:00
44	it =	6	nf =	7	nj =	6	F =	0.2D-13	inf=	3	time=	0:01
45	it =	3	nf =	4	nj =	3	F =	0.2D-09	inf=	3	time=	0:00
46	it =	41	nf =	52	nj =	41	F =	0.7D-04	inf=	2	time=	0:01
47	it =	25	nf =	26	nj =	25	F =	0.2D-09	inf=	3	time=	0:01
48	it =	5	nf =	6	nj =	5	F =	0.6D-12	inf=	3	time=	0:00
49	it =	4	nf =	5	nj =	4	F =	0.3D-10	inf=	3	time=	0:01
50	it =	3	nf =	4	nj =	3	F =	0.2D-09	inf=	3	time=	0:00
51	it =	13	nf =	14	nj =	13	F =	0.4D-14	inf=	3	time=	0:00
52	it =	7	nf =	8	nj =	7	F =	0.2D-11	inf=	3	time=	0:00
53	it =	5	nf =	6	nj =	5	F =	0.2D-13	inf=	3	time=	0:00
54	it =	12	nf =	15	nj =	12	F =	0.3D-10	inf=	3	time=	0:01
55	it =	14	nf =	15	nj =	14	F =	0.8D-11	inf=	3	time=	0:00
56	it =	5	nf =	6	nj =	5	F =	0.2D-08	inf=	3	time=	0:00
57	it =	5	nf =	6	nj =	5	F =	0.7D-08	inf=	3	time=	0:00
58	it =	18	nf =	21	nj =	18	F =	0.3D-13	inf=	3	time=	0:01
59	it =	6	nf =	7	nj =	6	F =	0.6D-12	inf=	3	time=	0:00
60	it =	20	nf =	23	nj =	20	F =	0.1D-12	inf=	3	time=	0:01
61	it =	200	nf =	201	nj =	200	F =	0.4D+01	inf=	12	time=	0:09
62	it =	19	nf =	22	nj =	19	F =	0.0D+00	inf=	3	time=	0:01
63	it =	4	nf =	5	nj =	4	F =	0.4D-09	inf=	3	time=	0:00
64	it =	3	nf =	4	nj =	3	F =	0.2D-09	inf=	3	time=	0:00
Total	it =	1193	nf =	1317	nj =	1193		succesful =		61	time=	0:42

```
Test for subroutine UFO-Newton:    200  variables
------------------------------------------------------------------------------
    1  it =    12  nf =      14  nj =    12  F = 0.1D-12  inf=    3  time= 0:04
    2  it =   137  nf =     151  nj =   137  F = 0.6D+00  inf=    2  time= 0:49
    3  it =     3  nf =       4  nj =     3  F = 0.3D-09  inf=    3  time= 0:01
    4  it =    59  nf =      80  nj =    59  F = 0.3D+01  inf=    2  time= 0:19
    5  it =    25  nf =      29  nj =    25  F = 0.4D-12  inf=    3  time= 0:08
    6  it =    18  nf =      19  nj =    18  F = 0.6D-08  inf=    3  time= 0:05
    7  it =    21  nf =      24  nj =    21  F = 0.1D-09  inf=    3  time= 0:08
    8  it =    18  nf =      21  nj =    18  F = 0.3D-14  inf=    3  time= 0:06
    9  it =    16  nf =      19  nj =    16  F = 0.1D-11  inf=    3  time= 0:05
   10  it =     8  nf =       9  nj =     8  F = 0.4D-14  inf=    3  time= 0:02
   11  it =    12  nf =      13  nj =    12  F = 0.0D+00  inf=    3  time= 0:04
   12  it =    17  nf =      18  nj =    17  F = 0.6D-08  inf=    3  time= 0:06
   13  it =    17  nf =      18  nj =    17  F = 0.4D-08  inf=    3  time= 0:05
   14  it =     6  nf =       7  nj =     6  F = 0.1D-09  inf=    3  time= 0:02
   15  it =     5  nf =       6  nj =     5  F = 0.2D-10  inf=    3  time= 0:02
   16  it =    52  nf =      53  nj =    52  F = 0.4D-10  inf=    3  time= 0:17
   17  it =    15  nf =      18  nj =    15  F = 0.1D-08  inf=    3  time= 0:06
   18  it =    16  nf =      17  nj =    16  F = 0.8D-12  inf=    3  time= 0:05
   19  it =    17  nf =      18  nj =    17  F = 0.9D-08  inf=    3  time= 0:06
   20  it =    13  nf =      14  nj =    13  F = 0.8D-12  inf=    3  time= 0:04
   21  it =    12  nf =      13  nj =    12  F = 0.5D-08  inf=    3  time= 0:04
   22  it =     9  nf =      10  nj =     9  F = 0.3D-12  inf=    3  time= 0:02
   23  it =   136  nf =     149  nj =   136  F = 0.3D-01  inf=    2  time= 0:49
   24  it =    14  nf =      15  nj =    14  F = 0.7D-08  inf=    3  time= 0:04
   25  it =     6  nf =       7  nj =     6  F = 0.7D-12  inf=    3  time= 0:02
   26  it =    12  nf =      13  nj =    12  F = 0.1D-10  inf=    3  time= 0:04
   27  it =    10  nf =      11  nj =    10  F = 0.9D-09  inf=    3  time= 0:03
   28  it =    14  nf =      16  nj =    14  F = 0.9D-10  inf=    3  time= 0:04
   29  it =    22  nf =      23  nj =    22  F = 0.4D-08  inf=    3  time= 0:07
   30  it =    10  nf =      11  nj =    10  F = 0.6D-10  inf=    3  time= 0:04
   31  it =    15  nf =      19  nj =    15  F = 0.7D-09  inf=    3  time= 0:04
   32  it =    39  nf =      40  nj =    39  F = 0.1D-10  inf=    3  time= 0:14
   33  it =   119  nf =     121  nj =   119  F = 0.6D-08  inf=    3  time= 0:29
   34  it =     5  nf =       6  nj =     5  F = 0.5D-17  inf=    3  time= 0:01
   35  it =     4  nf =       5  nj =     4  F = 0.9D-10  inf=    3  time= 0:01
   36  it =    19  nf =      22  nj =    19  F = 0.0D+00  inf=    3  time= 0:07
   37  it =     5  nf =       6  nj =     5  F = 0.8D-11  inf=    3  time= 0:01
   38  it =    19  nf =      20  nj =    19  F = 0.4D-13  inf=    3  time= 0:06
   39  it =    10  nf =      11  nj =    10  F = 0.1D-13  inf=    3  time= 0:04
   40  it =     5  nf =       6  nj =     5  F = 0.3D-14  inf=    3  time= 0:02
   41  it =    34  nf =      41  nj =    34  F = 0.5D-10  inf=    3  time= 0:09
   42  it =     5  nf =       6  nj =     5  F = 0.5D-08  inf=    3  time= 0:02
   43  it =     7  nf =       8  nj =     7  F = 0.2D-12  inf=    3  time= 0:02
   44  it =     6  nf =       7  nj =     6  F = 0.3D-13  inf=    3  time= 0:02
   45  it =     3  nf =       4  nj =     3  F = 0.3D-09  inf=    3  time= 0:01
   46  it =    41  nf =      49  nj =    41  F = 0.6D-04  inf=    2  time= 0:15
   47  it =    29  nf =      30  nj =    29  F = 0.0D+00  inf=    3  time= 0:10
   48  it =     5  nf =       6  nj =     5  F = 0.7D-10  inf=    3  time= 0:02
   49  it =     4  nf =       5  nj =     4  F = 0.3D-09  inf=    3  time= 0:01
   50  it =     3  nf =       4  nj =     3  F = 0.4D-09  inf=    3  time= 0:01
   51  it =    12  nf =      13  nj =    12  F = 0.5D-08  inf=    3  time= 0:03
   52  it =     7  nf =       8  nj =     7  F = 0.1D-10  inf=    3  time= 0:02
   53  it =     5  nf =       6  nj =     5  F = 0.2D-13  inf=    3  time= 0:02
   54  it =     9  nf =      11  nj =     9  F = 0.5D-08  inf=    3  time= 0:03
   55  it =    16  nf =      17  nj =    16  F = 0.4D-10  inf=    3  time= 0:05
   56  it =    56  nf =      57  nj =    56  F = 0.1D-12  inf=    3  time= 0:20
   57  it =    35  nf =      36  nj =    35  F = 0.2D-08  inf=    3  time= 0:12
   58  it =    26  nf =      30  nj =    26  F = 0.4D-12  inf=    3  time= 0:08
   59  it =     6  nf =       7  nj =     6  F = 0.7D-12  inf=    3  time= 0:02
   60  it =    21  nf =      24  nj =    21  F = 0.6D-09  inf=    3  time= 0:07
   61  it =   200  nf =     201  nj =   200  F = 0.8D+01  inf=   12  time= 1:21
   62  it =    19  nf =      22  nj =    19  F = 0.0D+00  inf=    3  time= 0:06
   63  it =     4  nf =       5  nj =     4  F = 0.9D-10  inf=    3  time= 0:01
   64  it =     3  nf =       4  nj =     3  F = 0.3D-09  inf=    3  time= 0:01
------------------------------------------------------------------------------
Total  it =  1528  nf =    1677  nj =  1528       succesful =  59    time= 8:34
```

Test for subroutine UFO-Broyden: 100 variables

1	it =	20	nf =	323	nj =	0	F = 0.8D-08	inf=	3	time= 0:00
2	it =	23	nf =	527	nj =	0	F = 0.9D-08	inf=	3	time= 0:01
3	it =	6	nf =	107	nj =	0	F = 0.3D-08	inf=	3	time= 0:00
4	it =	21	nf =	223	nj =	0	F = 0.6D-10	inf=	3	time= 0:00
5	it =	119	nf =	1931	nj =	0	F = 0.5D-08	inf=	3	time= 0:01
6	it =	53	nf =	361	nj =	0	F = 0.6D-08	inf=	3	time= 0:01
7	it =	67	nf =	977	nj =	0	F = 0.8D-10	inf=	3	time= 0:00
8	it =	53	nf =	459	nj =	0	F = 0.2D-08	inf=	3	time= 0:01
9	it =	32	nf =	536	nj =	0	F = 0.5D-08	inf=	3	time= 0:00
10	it =	17	nf =	118	nj =	0	F = 0.5D-08	inf=	3	time= 0:00
11	it =	30	nf =	332	nj =	0	F = 0.7D-09	inf=	3	time= 0:01
12	it =	31	nf =	238	nj =	0	F = 0.6D-08	inf=	3	time= 0:00
13	it =	40	nf =	447	nj =	0	F = 0.8D-08	inf=	3	time= 0:00
14	it =	12	nf =	113	nj =	0	F = 0.5D-08	inf=	3	time= 0:00
15	it =	28	nf =	230	nj =	0	F = 0.5D-11	inf=	3	time= 0:00
16	it =	80	nf =	784	nj =	0	F = 0.1D-02	inf=	2	time= 0:01
17	it =	60	nf =	464	nj =	0	F = 0.2D-09	inf=	3	time= 0:00
18	it =	32	nf =	436	nj =	0	F = 0.1D-07	inf=	3	time= 0:01
19	it =	15	nf =	116	nj =	0	F = 0.7D-08	inf=	3	time= 0:00
20	it =	27	nf =	329	nj =	0	F = 0.2D-09	inf=	3	time= 0:00
21	it =	29	nf =	332	nj =	0	F = 0.6D-08	inf=	3	time= 0:00
22	it =	30	nf =	333	nj =	0	F = 0.5D-08	inf=	3	time= 0:01
23	it =	46	nf =	349	nj =	0	F = 0.6D-08	inf=	3	time= 0:00
24	it =	50	nf =	859	nj =	0	F = 0.6D-03	inf=	2	time= 0:01
25	it =	7	nf =	108	nj =	0	F = 0.7D-08	inf=	3	time= 0:00
26	it =	28	nf =	129	nj =	0	F = 0.4D-08	inf=	3	time= 0:00
27	it =	23	nf =	326	nj =	0	F = 0.3D-08	inf=	3	time= 0:00
28	it =	23	nf =	427	nj =	0	F = 0.5D-08	inf=	3	time= 0:00
29	it =	11	nf =	112	nj =	0	F = 0.2D-14	inf=	3	time= 0:00
30	it =	19	nf =	423	nj =	0	F = 0.2D-08	inf=	3	time= 0:01
31	it =	23	nf =	528	nj =	0	F = 0.4D-08	inf=	3	time= 0:00
32	it =	88	nf =	903	nj =	0	F = 0.3D-08	inf=	3	time= 0:01
33	it =	227	nf =	2184	nj =	0	F = 0.8D-08	inf=	3	time= 0:01
34	it =	6	nf =	107	nj =	0	F = 0.2D-10	inf=	3	time= 0:01
35	it =	3	nf =	206	nj =	0	F = 0.7D-08	inf=	3	time= 0:00
36	it =	23	nf =	326	nj =	0	F = 0.9D-09	inf=	3	time= 0:00
37	it =	7	nf =	108	nj =	0	F = 0.2D-12	inf=	3	time= 0:00
38	it =	16	nf =	117	nj =	0	F = 0.2D-08	inf=	3	time= 0:00
39	it =	29	nf =	130	nj =	0	F = 0.4D-08	inf=	3	time= 0:00
40	it =	9	nf =	110	nj =	0	F = 0.2D-08	inf=	3	time= 0:00
41	it =	14	nf =	217	nj =	0	F = 0.1D-10	inf=	3	time= 0:00
42	it =	25	nf =	126	nj =	0	F = 0.9D-08	inf=	3	time= 0:01
43	it =	7	nf =	108	nj =	0	F = 0.2D-08	inf=	3	time= 0:00
44	it =	19	nf =	120	nj =	0	F = 0.1D-07	inf=	3	time= 0:00
45	it =	4	nf =	105	nj =	0	F = 0.1D-08	inf=	3	time= 0:00
46	it =	21	nf =	324	nj =	0	F = 0.6D-09	inf=	3	time= 0:01
47	it =	49	nf =	559	nj =	0	F = 0.3D-10	inf=	3	time= 0:00
48	it =	12	nf =	113	nj =	0	F = 0.9D-08	inf=	3	time= 0:00
49	it =	6	nf =	107	nj =	0	F = 0.3D-09	inf=	3	time= 0:02
50	it =	5	nf =	106	nj =	0	F = 0.7D-08	inf=	3	time= 0:00
51	it =	29	nf =	332	nj =	0	F = 0.6D-08	inf=	3	time= 0:00
52	it =	9	nf =	110	nj =	0	F = 0.2D-09	inf=	3	time= 0:00
53	it =	7	nf =	108	nj =	0	F = 0.1D-08	inf=	3	time= 0:00
54	it =	20	nf =	524	nj =	0	F = 0.5D-12	inf=	3	time= 0:01
55	it =	15	nf =	116	nj =	0	F = 0.3D-10	inf=	3	time= 0:00
56	it =	7	nf =	108	nj =	0	F = 0.6D-08	inf=	3	time= 0:00
57	it =	9	nf =	110	nj =	0	F = 0.8D-09	inf=	3	time= 0:00
58	it =	119	nf =	1931	nj =	0	F = 0.5D-08	inf=	3	time= 0:01
59	it =	8	nf =	210	nj =	0	F = 0.1D-08	inf=	3	time= 0:01
60	it =	50	nf =	352	nj =	0	F = 0.5D-08	inf=	3	time= 0:00
61	it =	59	nf =	364	nj =	0	F = 0.8D-08	inf=	3	time= 0:02
62	it =	23	nf =	326	nj =	0	F = 0.1D-08	inf=	3	time= 0:00
63	it =	3	nf =	206	nj =	0	F = 0.7D-08	inf=	3	time= 0:00
64	it =	4	nf =	105	nj =	0	F = 0.1D-08	inf=	3	time= 0:00
Total	it =	1987	nf =	23955	nj =	0	succesful =	62		time= 0:22

```
Test for subroutine UFO-Broyden:    200  variables
-------------------------------------------------------------------------------
    1  it =    22  nf =    624  nj =     0  F = 0.6D-08  inf=    3  time= 0:02
    2  it =    31  nf =   1036  nj =     0  F = 0.3D-08  inf=    3  time= 0:02
    3  it =     6  nf =    207  nj =     0  F = 0.2D-08  inf=    3  time= 0:01
    4  it =    25  nf =    427  nj =     0  F = 0.1D-10  inf=    3  time= 0:01
    5  it =    72  nf =   2480  nj =     0  F = 0.3D-08  inf=    3  time= 0:05
    6  it =    43  nf =   1056  nj =     0  F = 0.9D-08  inf=    3  time= 0:03
    7  it =    87  nf =   2296  nj =     0  F = 0.2D-14  inf=    3  time= 0:06
    8  it =    61  nf =    865  nj =     0  F = 0.1D-09  inf=    3  time= 0:02
    9  it =    23  nf =   1027  nj =     0  F = 0.2D-09  inf=    3  time= 0:02
   10  it =    18  nf =    219  nj =     0  F = 0.9D-08  inf=    3  time= 0:01
   11  it =    30  nf =    632  nj =     0  F = 0.9D-09  inf=    3  time= 0:02
   12  it =    31  nf =    438  nj =     0  F = 0.9D-08  inf=    3  time= 0:01
   13  it =    50  nf =   1063  nj =     0  F = 0.9D-08  inf=    3  time= 0:03
   14  it =    12  nf =    213  nj =     0  F = 0.5D-08  inf=    3  time= 0:00
   15  it =    21  nf =    423  nj =     0  F = 0.6D-09  inf=    3  time= 0:02
   16  it =    82  nf =   1486  nj =     0  F = 0.2D-02  inf=    2  time= 0:04
   17  it =    60  nf =    864  nj =     0  F = 0.2D-09  inf=    3  time= 0:02
   18  it =    29  nf =   1035  nj =     0  F = 0.2D-09  inf=    3  time= 0:03
   19  it =    18  nf =    219  nj =     0  F = 0.2D-09  inf=    3  time= 0:00
   20  it =    24  nf =    627  nj =     0  F = 0.3D-09  inf=    3  time= 0:02
   21  it =    26  nf =    628  nj =     0  F = 0.6D-08  inf=    3  time= 0:02
   22  it =    85  nf =   6114  nj =     0  F = 0.9D+00  inf=   11  time= 0:12
   23  it =   181  nf =    985  nj =     0  F = 0.1D-07  inf=    3  time= 0:05
   24  it =    21  nf =    218  nj =     0  F = 0.2D-08  inf=    3  time= 0:01
   25  it =     8  nf =    205  nj =     0  F = 0.8D-10  inf=    3  time= 0:00
   26  it =    27  nf =    224  nj =     0  F = 0.4D-08  inf=    3  time= 0:01
   27  it =    23  nf =    613  nj =     0  F = 0.5D-08  inf=    3  time= 0:02
   28  it =    25  nf =    813  nj =     0  F = 0.2D-08  inf=    3  time= 0:01
   29  it =    12  nf =    209  nj =     0  F = 0.2D-14  inf=    3  time= 0:01
   30  it =    31  nf =    622  nj =     0  F = 0.8D-08  inf=    3  time= 0:02
   31  it =    27  nf =   1032  nj =     0  F = 0.2D-08  inf=    3  time= 0:02
   32  it =    83  nf =   1495  nj =     0  F = 0.6D-10  inf=    3  time= 0:04
   33  it =   264  nf =   5723  nj =     0  F = 0.1D-07  inf=    3  time= 0:15
   34  it =     6  nf =    207  nj =     0  F = 0.2D-10  inf=    3  time= 0:01
   35  it =     5  nf =    409  nj =     0  F = 0.5D-10  inf=    3  time= 0:01
   36  it =    23  nf =    626  nj =     0  F = 0.1D-08  inf=    3  time= 0:01
   37  it =     7  nf =    208  nj =     0  F = 0.3D-12  inf=    3  time= 0:01
   38  it =    19  nf =    220  nj =     0  F = 0.1D-09  inf=    3  time= 0:00
   39  it =    12  nf =    414  nj =     0  F = 0.1D-08  inf=    3  time= 0:01
   40  it =     9  nf =    210  nj =     0  F = 0.2D-08  inf=    3  time= 0:01
   41  it =    14  nf =    417  nj =     0  F = 0.3D-10  inf=    3  time= 0:01
   42  it =    25  nf =    226  nj =     0  F = 0.9D-08  inf=    3  time= 0:01
   43  it =     8  nf =    209  nj =     0  F = 0.9D-10  inf=    3  time= 0:00
   44  it =    19  nf =    220  nj =     0  F = 0.9D-08  inf=    3  time= 0:01
   45  it =     4  nf =    205  nj =     0  F = 0.1D-08  inf=    3  time= 0:01
   46  it =    41  nf =   2051  nj =     0  F = 0.2D-03  inf=    2  time= 0:21
   47  it =    56  nf =   1066  nj =     0  F = 0.3D-09  inf=    3  time= 0:04
   48  it =    13  nf =    214  nj =     0  F = 0.1D-08  inf=    3  time= 0:00
   49  it =     6  nf =    207  nj =     0  F = 0.2D-08  inf=    3  time= 0:10
   50  it =     5  nf =    206  nj =     0  F = 0.1D-07  inf=    3  time= 0:01
   51  it =    26  nf =    628  nj =     0  F = 0.6D-08  inf=    3  time= 0:02
   52  it =     9  nf =    210  nj =     0  F = 0.2D-09  inf=    3  time= 0:00
   53  it =     7  nf =    208  nj =     0  F = 0.2D-08  inf=    3  time= 0:02
   54  it =    16  nf =   1020  nj =     0  F = 0.3D-08  inf=    3  time= 0:02
   55  it =    17  nf =    218  nj =     0  F = 0.2D-10  inf=    3  time= 0:01
   56  it =     9  nf =    210  nj =     0  F = 0.2D-09  inf=    3  time= 0:00
   57  it =    10  nf =    211  nj =     0  F = 0.1D-08  inf=    3  time= 0:01
   58  it =    72  nf =   2480  nj =     0  F = 0.2D-08  inf=    3  time= 0:05
   59  it =     8  nf =    410  nj =     0  F = 0.2D-08  inf=    3  time= 0:02
   60  it =    77  nf =    678  nj =     0  F = 0.8D-08  inf=    3  time= 0:03
   61  it =   228  nf =    630  nj =     0  F = 0.2D-01  inf=    2  time= 0:15
   62  it =    23  nf =    626  nj =     0  F = 0.1D-08  inf=    3  time= 0:02
   63  it =     5  nf =    409  nj =     0  F = 0.5D-10  inf=    3  time= 0:01
   64  it =     4  nf =    205  nj =     0  F = 0.1D-08  inf=    3  time= 0:01
-------------------------------------------------------------------------------
Total  it =  2341  nf =  51576  nj =     0       succesful =  60    time= 2:55
```

```
Test for subroutine qngq1:    500  variables
------------------------------------------------------------------------------
    1  it =    23  nf =    1525  nj =     0  F = 0.2D-09  inf=    3  time= 0:32
    2  it =    40  nf =    4548  nj =     0  F = 0.5D-08  inf=    3  time= 1:32
    3  it =     6  nf =     507  nj =     0  F = 0.3D-08  inf=    3  time= 0:11
    4  it =    33  nf =    1035  nj =     0  F = 0.1D-08  inf=    3  time= 0:24
    5  it =    94  nf =    5608  nj =     0  F = 0.4D-08  inf=    3  time= 1:59
    6  it =    49  nf =    1050  nj =     0  F = 0.8D-08  inf=    3  time= 0:26
    7  it =    90  nf =    4098  nj =     0  F = 0.3D-08  inf=    3  time= 1:30
    8  it =    82  nf =    2085  nj =     0  F = 0.3D-11  inf=    3  time= 0:50
    9  it =    45  nf =    3052  nj =     0  F = 0.8D-08  inf=    3  time= 1:04
   10  it =    14  nf =    1017  nj =     0  F = 0.5D-10  inf=    3  time= 0:22
   11  it =    30  nf =    1532  nj =     0  F = 0.1D-08  inf=    3  time= 0:33
   12  it =    32  nf =    1039  nj =     0  F = 0.5D-08  inf=    3  time= 0:24
   13  it =    41  nf =    2050  nj =     0  F = 0.9D-08  inf=    3  time= 0:45
   14  it =    12  nf =     513  nj =     0  F = 0.6D-08  inf=    3  time= 0:11
   15  it =    24  nf =    1025  nj =     0  F = 0.7D-10  inf=    3  time= 0:23
   16  it =    88  nf =    3592  nj =     0  F = 0.2D-02  inf=    2  time= 1:21
   17  it =    60  nf =    2064  nj =     0  F = 0.4D-09  inf=    3  time= 0:49
   18  it =    48  nf =    3058  nj =     0  F = 0.2D-08  inf=    3  time= 1:05
   19  it =    21  nf =     522  nj =     0  F = 0.3D-09  inf=    3  time= 0:13
   20  it =    39  nf =    1541  nj =     0  F = 0.7D-08  inf=    3  time= 0:34
   21  it =    26  nf =    1529  nj =     0  F = 0.5D-09  inf=    3  time= 0:33
   22  it =    56  nf =    9075  nj =     0  F = 0.5D+00  inf=   11  time= 3:04
   23  it =    42  nf =    3053  nj =     0  F = 0.7D-08  inf=    3  time= 1:08
   24  it =    26  nf =     511  nj =     0  F = 0.1D-08  inf=    3  time= 0:13
   25  it =     8  nf =     493  nj =     0  F = 0.8D-10  inf=    3  time= 0:10
   26  it =    20  nf =     990  nj =     0  F = 0.3D-08  inf=    3  time= 0:22
   27  it =    19  nf =    1474  nj =     0  F = 0.4D-08  inf=    3  time= 0:29
   28  it =    26  nf =    1966  nj =     0  F = 0.4D-08  inf=    3  time= 0:40
   29  it =    13  nf =     498  nj =     0  F = 0.5D-10  inf=    3  time= 0:11
   30  it =    23  nf =    1478  nj =     0  F = 0.8D-08  inf=    3  time= 0:31
   31  it =    28  nf =    2533  nj =     0  F = 0.2D-08  inf=    3  time= 0:43
   32  it =    83  nf =    4599  nj =     0  F = 0.7D-09  inf=    3  time= 1:42
   33  it =   141  nf =    7175  nj =     0  F = 0.4D-08  inf=    3  time= 2:35
   34  it =     6  nf =     507  nj =     0  F = 0.4D-10  inf=    3  time= 0:11
   35  it =    11  nf =    1014  nj =     0  F = 0.5D-08  inf=    3  time= 0:23
   36  it =    23  nf =    1526  nj =     0  F = 0.2D-08  inf=    3  time= 0:32
   37  it =     7  nf =     508  nj =     0  F = 0.4D-12  inf=    3  time= 0:12
   38  it =    22  nf =     523  nj =     0  F = 0.1D-09  inf=    3  time= 0:13
   39  it =    14  nf =    1015  nj =     0  F = 0.9D-08  inf=    3  time= 0:21
   40  it =     9  nf =     510  nj =     0  F = 0.2D-08  inf=    3  time= 0:11
   41  it =    15  nf =    1018  nj =     0  F = 0.2D-08  inf=    3  time= 0:22
   42  it =    25  nf =     526  nj =     0  F = 0.1D-07  inf=    3  time= 0:13
   43  it =     8  nf =     509  nj =     0  F = 0.2D-09  inf=    3  time= 0:11
   44  it =    19  nf =     520  nj =     0  F = 0.9D-08  inf=    3  time= 0:13
   45  it =     4  nf =     505  nj =     0  F = 0.2D-08  inf=    3  time= 0:14
   46  it =    39  nf =    5049  nj =     0  F = 0.5D-03  inf=    2  time= 6:13
   47  it =    91  nf =    4604  nj =     0  F = 0.3D-08  inf=    3  time= 1:57
   48  it =    12  nf =     513  nj =     0  F = 0.6D-08  inf=    3  time= 0:12
   49  it =     9  nf =     510  nj =     0  F = 0.9D-08  inf=    3  time= 2:28
   50  it =     6  nf =     507  nj =     0  F = 0.8D-10  inf=    3  time= 0:22
   51  it =    26  nf =    1529  nj =     0  F = 0.5D-09  inf=    3  time= 0:34
   52  it =     9  nf =     510  nj =     0  F = 0.1D-08  inf=    3  time= 0:11
   53  it =     7  nf =     508  nj =     0  F = 0.3D-08  inf=    3  time= 0:27
   54  it =    21  nf =    2025  nj =     0  F = 0.1D-08  inf=    3  time= 0:42
   55  it =    20  nf =     521  nj =     0  F = 0.2D-09  inf=    3  time= 0:12
   56  it =     9  nf =     510  nj =     0  F = 0.2D-09  inf=    3  time= 0:12
   57  it =    10  nf =     511  nj =     0  F = 0.7D-09  inf=    3  time= 0:11
   58  it =    94  nf =    5608  nj =     0  F = 0.4D-08  inf=    3  time= 2:00
   59  it =     8  nf =    1010  nj =     0  F = 0.3D-08  inf=    3  time= 0:39
   60  it =   116  nf =    1618  nj =     0  F = 0.1D-08  inf=    3  time= 0:46
   61          deleted from this test (long time supposed)
   62  it =    23  nf =    1526  nj =     0  F = 0.2D-08  inf=    3  time= 0:33
   63  it =    11  nf =    1014  nj =     0  F = 0.5D-08  inf=    3  time= 0:23
   64  it =     4  nf =     505  nj =     0  F = 0.2D-08  inf=    3  time= 0:19
------------------------------------------------------------------------------
Total  it =  2060  nf =  114094  nj =     0       succesful =  60    time=49:06
```