DISTRIBUTION OF THE ALGEBRAIC AND DISCRETIZATION ERROR IN NUMERICAL SOLUTION OF 1D POISSON MODEL PROBLEM

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Abstract

On a simple model problem we show some important phenomena which should be taken into account when solving large scale mathematical modelling problems in general. It is demonstrated that the algebraic error in numerical solution of the discretized problem can have large local components and it can therefore significantly dominate the total error in some part of the domain, even if the globally measured algebraic error is comparable to or smaller than the globally measured discretization error. Therefore, the a posteriori error analysis should include the possible algebraic error.