

# SOME IMPROVEMENTS TO THE FEAST ALGORITHM

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## **Abstract**

The FEAST algorithm was introduced in 2009 by E. Polizzi as a method for the solution of some eigenvalue problems, in particular,  $Ax = \lambda Bx$  with  $A$  symmetric and  $B$  symmetric positive definite.

In a recent publication, we presented results of an extensive numerical study with the method. This study highlighted several numerical issues of the method. In particular, we addressed the size of the search space and the orthogonality of eigenvectors.

In this talk, we present some improvements making the method more robust, especially with regard to the two issues mentioned before.

We then discuss some strategies for parallelization and finally we give some numerical results.