Applied Mathematics

Optimal quotients for solving large eigenvalue problems

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Optimal quotients for solving large eigenvalue problems (generalized or not) are introduced by imposing optimality conditions on linear independency. To approximate an eigenvalue, these conditions result from maximizing the one dimensional projection of the eigenvalue problem. If applying the inverse is affordable, this gives rise to an optimal quotient iteration.
Otherwise, to approximate an eigenvector, optimality conditions result from minimizing linear independency. When combined, these conditions give rise to an optimal method for solving the generalized eigenvalue problem. These methods extend to subspaces in a natural way. Then, for the standard eigenvalue problem, an optimal Arnoldi methodarises to replace the standard Arnoldi method.
This is joint work with Vesa Kotila.