

An optimal Q-OR Krylov method for solving linear systems

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There exist many pairs of Q-OR/Q-MR methods for solving non-symmetric linear systems. Well-known examples are FOM/GMRES, BiCG/QMR and Hessenberg/CMRH. These pairs use different bases of the Krylov subspace. In this lecture we will study the convergence properties of these methods. Based on this knowledge, we will show how to construct a non-orthogonal basis of the Krylov space for which the Q-OR method yields the same residual norms as GMRES. Therefore, for a given Krylov subspace, this is the optimal Q-OR method. We will illustrate this with numerical experiments.