Incomplete preconditioners for symmetric quasi definite systems

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We consider a class of incomplete preconditioners for sparse symmetric quasi definite linear systems [3], which are known to admit a Cholesky $LDL^T$ factorization (with $D$ diagonal and indefinite). These specially structured systems arise when computing search directions in interior-point methods for dual-regularized convex quadratic programs (QPs), and in the solution of regularized least squares.

Using the CSparse [1] package, we implement an incomplete sparse Cholesky factorization that allows the user to specify the amount of fill-in. The incomplete factorization proves to be an effective preconditioner for SYMMLQ [2] used within an interior-point code. We illustrate the performance of the preconditioner on a set of KKT matrices derived from QPs and regularized linear programs.

References


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