Ingenieurfakultät Bau Geo Umwelt

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Titel des Beitrags: An extended QR-solver for large profiled matrices

Abstract: A new method for the solution of the standard eigenvalue problem with large symmetric profile matrices is presented. The method is based on the well-known QR-method for dense matrices. A new, flexible and reliable extension of the method is developed that is highly suited for the independent computation of any set of eigenvalues. In order to analyze the weak convergence of the method in the presence of clustered eigenvalues, the QR-method is studied. Two effective, stable and numerically cheap extensions are introduced to overcome the troublesome stagnation of the convergence. A repeated preconditioning process in combination with Jacobi rotations in the parts of the matrix with the strongest convergence is developed to significantly improve both local and global convergence. The extensions preserve the profile structure of the matrix. The efficiency of the new method is demonstrated with several examples.

Stichworte: QR-algorithm; structured matrix; preconditioning; Jacobi; plate vibration


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