Calculating the Sorted [Generalized, Real] Schur Decomposition in Gauss

The *Schur* decomposition of *A*x = l*x*, where *l* is a scalar, *x* a vector, and *A* is a matrix (possibly complex), gives the matrices *Q*, and *T* such that *Q* is orthogonal (unitary) and *T* upper triangular. They satisfy *A = Q*T*QH*, where *QH* is the transpose (conjugate transpose) of *Q*. The real Schur decomposition is similar, but operates on real matrices only. In this case, *T* is only upper quasi-triangular.

The *generalized Schur* decomposition of *A*x = l*B*x*, where *l* is a scalar, *x* a vector, and *A* and *B* two matrices (possibly complex), gives the matrices *Q*, *T, Z* and *S* such that *Q* and *Z* are orthogonal (unitary) and *T* and *S* upper triangular. They satisfy *A = Q*T*ZH* and *B = Q*S*ZH*, where *ZH* is the transpose (conjugate transpose) of *Z*. The real generalized Schur decomposition is similar, but operates on real matrices only. In this case, *T* is only upper quasi-triangular.

LAPACK 3.0 (from http://www.netlib.org/lapack/index.html) includes routines for calculating the (generalized) (real) Schur decomposition, and optionally reorder it so the small (generalized) eigenvalues (in magnitude) come first. I have compiled and linked these routines into four Windows DLLs, and also written four Gauss procedures as front ends.

You need Gauss for Windows to use this code.

The dlls were recreated on 1 May 2003 in order to make them compatible with Gauss 5.0. They have also been tested on Gauss 3.2.38.

Good Luck!

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