JOHN MAY, Maplesoft, 615 Kumpf Drive, Waterloo, Ontario

A Symbolic-Numeric Approach to Computing Inertia of Products of Matrices of Rational Numbers

Consider a rational matrix, particularly one whose entries have large numerators and denominators but which is presented as a product of very sparse matrices with relatively small entries. We will discuss symbolic-numeric hybrid strategies to compute the inertia (the number of positive, negative, and zero eigenvalues) of such a matrix in the nonsingular case that effectively exploits the product structure. The method works by computing the numerical LU decomposition of the product with a succession of floating point QR decompositions of the small, sparse, factors in the product representation.

This is joint work with B. David Saunders, and David H. Wood in the Department of Computer Science at the University of Delaware.