ON THE DIRECT SOLUTION OF VERY LARGE SPARSE LINEAR SYSTEMS USING OUT-OF-CORE TECHNIQUES

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Abstract

An effective way of extending the size of problem that can be successfully solved using a sparse direct solver is to allow the system matrix and its factors to be held out-of-core. In this talk, we discuss the design and development of new sparse out-of-core solvers that will be included in the next release of the HSL mathematical software library [1]. An important feature of the codes is that all input and output to disk is performed through a set of Fortran subroutines that manage a virtual memory system so that actual input/output occurs only when really necessary. We describe this system and highlight other key features of the new packages. Numerical results for a range of large-scale problems arising from practical applications are presented and comparisons made with existing HSL solvers.

References

[1] HSL. A collection of Fortran codes for large-scale scientific computation. See `http://hsl.rl.ac.uk/`, 2004.