A COMPARISON OF EIGENSOLVERS FOR LARGE-SCALE THREE-DIMENSIONAL MODAL ANALYSIS

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Last year, Kropp and Heiserer [1] presented large-scale eigenvalue computations for analyzing the vibrations of car bodies. Their study showed that, for these two-dimensional problems, the automated multilevel substructuring method (AMLS) [2,3] is very efficient and accurate high into the frequency range.

AMLS is a component mode synthesis method and it shares many features with multifrontal factorizations. The AMLS method recursively subdivides a structure into numerous subdomain and interface eigenvalue problems. For two-dimensional problems, the size of interface problems grows slowly. Unfortunately, for three-dimensional problems, the interfaces grow more rapidly, potentially reducing the efficiency of AMLS.

In this talk, we will consider the modal analysis of large-scale three-dimensional problems. We will assess the numerical precision and the efficiency of the computation, when using such a component synthesis method, the preconditioned eigensolver LOBPCG [4], or the shift-invert Lanczos algorithm [5].

References

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