

AN INTRODUCTION TO AUTOMATED MULTI-LEVEL SUBSTRUCTURING IN STRUCTURAL DYNAMICS

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Dynamic analysis of complex two- and three-dimensional structures frequently involves finite element discretizations with over a million unknowns. In practice, the finite element matrices are projected onto the low frequency eigenspace computed via a partial eigensolution.

An alternative is to compute the needed eigenspace via Automated Multi-Level Substructuring (AMLS) where the structure is recursively divided into thousands of subdomains. Approximations to the eigenvectors are computed from these subdomain eigenvalue problems.

Our presentation will introduce AMLS as a recently introduced alternative for efficiently computing the eigenspace needed in modal analysis. AMLS first recursively divides the structure into numerous subdomains and interfaces. Then, approximations to the eigenspace are computed by solving eigenvalue problems on subdomain and interface eigenvalue problems produced by the substructuring.