
Jan Mandel
**Adaptive Selection of Face Coarse Degrees of Freedom in
the BDDC and the FETI-DP Iterative Substructuring
Methods**

Department of Mathematical Sciences
University of Colorado at Denver
and Health Sciences Center
Campus Box 170
P O Box 173364
Denver
CO 80217-3364
`jmandel@math.cudenver.edu`
B. Sousedik

We propose adaptive selection of the coarse space of the BDDC and FETI-DP iterative substructuring methods by adding coarse degrees of freedom with support on selected intersections of adjacent substructures. The coarse degrees of freedom are constructed using eigenvectors associated with the intersections. The minimal number of coarse degrees of freedom on the selected intersections is added to decrease a heuristic indicator of the condition number under a target value specified a priori. It is assumed that the starting coarse degrees of freedom are already sufficient to prevent relative rigid body motions of any selected pair of adjacent substructures. It is shown numerically on 2D elasticity problems that the indicator based on pairs of substructures with common edges predicts reasonably well the actual condition number, and that the method can select adaptively the hard part of the problem and concentrate computational work there to achieve good convergence of the iterations at a modest cost.