

1056-65-616

Eun-Hee Park* (epark2@math.lsu.edu), Center for Computation & Technology, Louisiana State University, 332 Johnston Hall, Baton Rouge, LA 70803, and **Chang-Ock Lee**. *A Dual Iterative Substructuring Method with a Penalty Term in Three Dimensions*.

In our previous work [Numer. Math. 112 (2009), 89–113] for two dimensional problems, a dual iterative substructuring method was proposed, which is a variant of the FETI-DP method. Unlike the FETI-DP method, the proposed method imposes the continuity by not only the pointwise matching condition on the interface but also using a penalty term which measures the jump across the interface.

In this talk, we introduce an extension of a dual substructuring method with a penalty term to three dimensional problems. By focusing on the geometric complexity of an interface in 3D caused by the coupling among adjacent subdomains, a penalty term with a penalization parameter η is constructed, which makes the associated 3D algorithm more efficient in practical sense. In spite of the absence of any preconditioners, it is shown that for a large η , the condition number of the resultant dual problem is bounded by a constant independent of both the subdomain size H and the mesh size h . From the implementational viewpoint of the proposed method, special attention is paid to establish an optimal preconditioner with respect to a penalization parameter η in order to prevent a large penalization parameter from making subdomain problems ill-conditioned. (Received September 14, 2009)