COUPLING OF ELEMENT-FREE GALERKIN METHOD AND BOUNDARY ELEMENT METHOD USING THE DOMAIN DECOMPOSITION

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An algorithm to couple the Element-Free Galerkin Method (EFGM) and the Boundary Element Method (BEM) by means of the domain decomposition approach is presented in this paper. In the proposed method, the domain of original problem is decomposed into EFGM and BEM sub-domains that partially overlap. Then, in this coupling method, there is no need to combine the coefficients matrices of the EFGM and the BEM sub-domains as required in most of the conventional coupling methods. Thus each sub-domain is separately computed, and successive renewal of the variables on the overlapped region is performed to reach the final convergence. A second advantage is that different formulations for EFGM and BEM can be adopted as base programs for coupling only computer codes. By this approach, interesting local regions such as crack regions or stress concentration regions can be modeled by EFGM sub-domain and other parts can be treated by BEM sub-domain. The presented example, an infinite plate with a hole under tension, shows the performance of the proposed method compared with other conventional methods such as EFGM analysis and EFGM-BEM variational coupling analysis. Consequently, the proposed method can handle solid problems with discontinuities or stress concentration in the large domain successfully and efficiently based on the EFGM.

References

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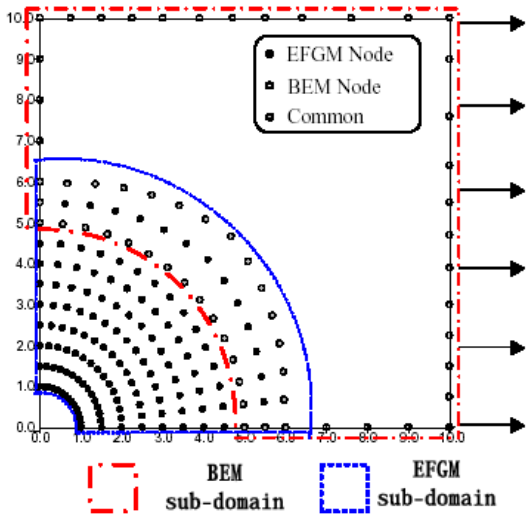
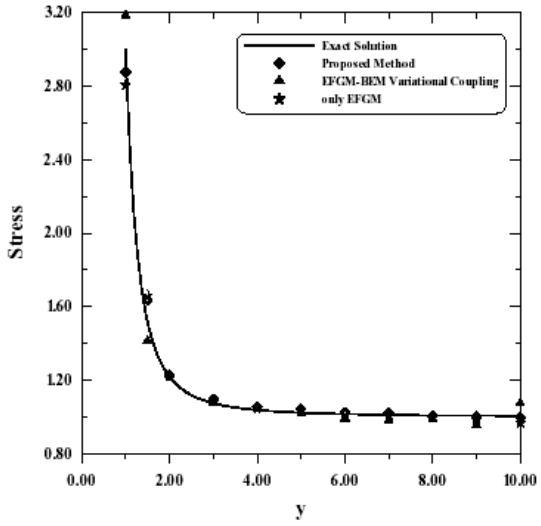
[2] G. R. Liu and Y. T. Gu, "Coupling of Element Free Galerkin and Hybrid Boundary Element Method", *Computational Mechanics*, v. 26, p. 166-173, 2000.



Model Description



Results for an infinite plate with a hole