

A Variant of the Extended Finite Element Method

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We present a variant of the extended finite element method of Duax et al [1]. Rather than utilizing enhanced basis functions, we add extrinsic model degrees of freedom as done by Hansbo and Hansbo [2] to capture interface element discontinuities. We then consider problems with solid and voids so that these extrinsic degrees of freedom can in fact be eliminated, leaving us with a fairly conventional looking formulation. The formulation is useful as it alleviates meshing problems and simplifies shape optimization. Examples to illustrate these benefits are provided.

References

- [1] C. Duax, N. Moës, J. Dolbow, N. Sukumar, and T. Belytschko, “Arbitrary branched and intersecting cracks with the extended finite element method”, *International Journal for Numerical Methods in Engineering*, v. 48, p. 1741-1760, 2000.
- [2] A. Hansbo and P. Hansbo, “An unfitted finite element method for elliptic interface problems”, *Chalmers Finite Element Center*, Preprint 2001-21, (<http://www.phi.chalmers.se/preprints>).