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ACCURATE EVALUATION OF K IN XFEM USING ERROR ESTIMATION IN QUANTITIES OF INTEREST BASED ON EQUILIBRATED RECOVERY

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ABSTRACT

In this work we propose an *a posteriori* recovery-based error estimation procedure which considers the stress intensity factor K as the quantity of interest for extended finite element (FE) approximations. In general, error estimators in quantities of interest have been based on residual techniques, and so far, there is no available procedure which considers an equilibrated recovery technique that can be used in standard or enriched FE frameworks. The technique proposed herein is based on the enhanced superconvergent patch recovery technique presented in [1] to evaluate the recovered stress fields $\boldsymbol{\sigma}^*$ of the primal and dual problems, which are used to obtain the error estimate. To improve the quality of the recovered fields we decompose the raw stress field obtained from the finite element approximations into singular and smooth parts, and enforce the fulfilment of boundary and internal equilibrium equations. The results indicate an accurate estimation of the error in K for benchmark problems with exact solution.

REFERENCES

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