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ACCURACY ASSESSMENT OF THE EXTENDED FINITE ELEMENT METHOD: ADAPTIVITY, COMPARISON WITH COMPETING METHODS, INDUSTRIALISATION

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ABSTRACT

The extended finite element method has become a competitive tool for thesolution of problems with evolving discontinuities and singularities. In the fieldof structural reliability and failure, it has quickly been embraced by industry,with several existing and ongoing implementations in commercial software packages.

The nature of the method, its elegance and relative closeness to the well-established finite element method have made it a competitive tool for industrial fracture mechanics [1]. Nonetheless, little work has been done to assess the dis-cretisation error associated with extended finite elements or other partition of unity methods with extrinsic enrichment. The rapid uptake of such methods by industry will soon require adequate error estimation tools to be available to the analysts.

The approximation error should be evaluated and adaptive strategies developed. Moreover, the extended finite element method should be fully compared, both on the computational cost point of view and on that of **accuracy**, to **alternate approximation** tools (FEM with **remeshing**, **meshfree** methods, **interface** elements, **discrete** and **lattice** models, **Trefftz** formulations), which all have distinct advantages and drawbacks depending on the application. This minisymposium aims at increasing the community's understanding of the **accuracy** of extended finite element methods, with a particular emphasis on (but not a restriction to) fracture mechanics applications. The development of **a posteriori error estimates** and adaptive strategies [2-6], for instance is of key interest.

The second goal of the minisymposium is to show industrial applications of the **XFEM** [1] and evaluate the **accuracy** of the results and propose improvements of the **XFEM** to ease its industrial development.

The third objective is to provide comparative studies that will contribute to increasing our understanding of the relationships between **XFEM** and its competitors.

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