Multiscale fracture, model reduction, enrichment and real-time simulations of cutting

Stéphane P.A. Bordas
School of Engineering, Cardiff University, Queen's Buildings,
The Parade, Cardiff CF24 3AA, Wales, UK, bordasS@cardiff.ac.uk

Keywords: *multiscale method, extended bridging domain method, adaptive domain decomposition based model reduction*

ABSTRACT

In the first part of this presentation, we present a brief introduction to multiscale methods for fracture. We then discuss one particular method based on an extended bridging domain method (XBDM) for 3D dynamic crack propagation in brittle materials.

In a second part, motivated by the real time simulation of cutting, we address another technique to reduce computational expense in multiscale fracture, namely adaptive domain decomposition based model reduction, as an alternative to concurrent methods and enrichment. To conclude, we present briefly a method based on GPUs to simulate cutting in real time in the corrotational formulations of large deformations.