14th World Congress on Computational Mechanics (WCCM XIV)
8th European Congress on Computational Methods in Applied Science and Engineering (ECCOMAS 2020)
July 19- 24, 2020, Paris, France

EMBEDDED WEAK-TO-STRONG DISCONTINUITY BASED COMPUTATIONAL APPROACHES

TRACK 100 - FRACTURE, DAMAGE AND FAILURE MECHANICS

P. LONGERE[*], H. WAISMAN[†] AND R. GRACIE[§]

[*] Université de Toulouse, ISAE-SUPAERO, Institut Clément Ader CNRS 5312
3 rue Caroline Aigle, 31400 Toulouse, France
patrice.longere@isae.fr and http://institut-clement-ader.org/

† Columbia University
624 Mudd. Building, 500 West 120th Street, New York, NY 10027, USA
waisman@civil.columbia.edu and https://civil.columbia.edu/

[§] University of Waterloo
200 University Avenue West, Waterloo, Ontario, Canada N2L 3G1
rgracie@uwaterloo.ca and https://uwaterloo.ca/civil-environmental-engineering/

Key words: Localization, Crack propagation, Embedded discontinity approach, Numerical methods.

ABSTRACT

Under severe conditions, the progressive failure of engineering structures generally results from diffused damage induced by micro-defects (micro-voids in ductile materials, micro-cracks in quasi-brittle materials) initiation and growth, coalescence of the micro-defects in narrow bands followed by the formation and propagation of macro-cracks. Computational modeling these two failure processes is challenging by itself but even more so when describing the progressive transition from a weak discontinuity (localization bands) to a strong discontinuity (cracks) while ensuring the mesh objectivity.

This mini-symposium aims at providing a forum for discussing new developments in failure and fracture mechanics including: embedded (weak and/to strong) discontinuity based computational approaches to address problems involving localization banding and crack propagation. We welcome all relevant numerical methods addressing those challenges, for example X-FEM, E-FEM, CZM, Damage and Phase field, peridynamics, etc…