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

MODEL-BASED SIMULATIONS OF STRUCTURAL RESPONSES UNDER EXTREME LOADING CONDITIONS

TRACK NUMBER (100 - FRACTURE, DAMAGE AND FAILURE MECHANICS)

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Key words: Model-Based Simulations, Extreme Loading Conditions.

ABSTRACT

Structural responses under extreme loading conditions, such as impact, penetration, explosion, high-speed machining, and manufacture and surface treatment under high temperature and high pressure, have been paid wide attention in the recent years because of the interesting and important phenomena involved and the great challenges to computer modelling and simulation. As localization, fracture, fragmentation and phase transformation occur, the multi-scale and multi-physics phenomena should be fully considered, and new theories and numerical methods are needed to model and simulate the structural responses under extreme loading conditions in accurate and effective ways. This minisymposium aims at providing an opportunity for academic researchers and industrial engineers in the related fields to discuss the recent progress and to promote collaboration. Those who have been working on in the related fields are cordially invited to exchange their ideas and research results in this minisymposium. Presentations are solicited in all subjects related to the model-based simulations of structural responses under extreme loading conditions, which include but are not limited to the followings:

1) Development and improvement of advanced numerical methods, such as meshfree particle methods, X-FEM, boundary-type methods, isogeometric methods, discrete element methods,

peridynamics, for modelling and simulation of structural responses under extreme loading conditions

2) Simulation-based disaster prediction and mitigation

3) Efficient and accurate impact-contact algorithms

4) Multi-scale computational methods and multi-scale modelling schemes

5) Numerical methods and coupling algorithms for multi-physics processes

6) Parallel algorithms and large-scale computation for the problems with extreme loading

7) Coupled Lagrangian-Eulerian schemes for the problems with moving boundaries

8) Inverse solutions and optimization in the problems with extreme loading

9) Verification, validation, and software development

10) Numerical algorithm implementation and simulation software development

11) Other related subjects