Structural integrity under extreme loads

Topic: High fidelity models

TITLE: Development of a custom homogenized composite finite element

RESEARCH BACKGROUND:
Composite materials are intrinsically multiscale materials that present multiple failure modes, which are challenging to describe through FE models. Multiple criteria are present in the literature and commercial FE packages lack the implementation of all of them. This thesis aims at develop user defined finite element that implement different constitutive behaviour of composite materials.

RESEARCH ACTIVITIES:
1. Literature review on composite failure and post-damage behaviour.
2. Implementation of custom constitutive laws (programming language: Fortran)
3. Single element analyses of different constitutive laws and failure criteria.
4. Full scale numerical simulation of composite panels.

METHODOLOGY: Analytical-Numerical

DURATION: 6-9 months

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