Some problems in the modeling of crack initiation and propagation at micro and meso scale in composite materials and their adhesive joints

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Design and analysis of structures made from long fibre reinforced composites require development of failure criteria able to predict the minimum load originating failure. A development of new failure criteria should be based on the understanding of damage mechanisms developed on the micro and meso scale in these composites and their adhesively bonded joints. Contributions of our research group to the modeling of some of these damage mechanisms are reviewed first. Then, the following two particular problems are treated in more detail: *i)* Analysis of singular elastic solutions at multi-material corners (cross points) in composites and their joints, and *ii)* Prediction of initiation and growth of a fibre-matrix debonding under transverse tension applying Finite Fracture Mechanics and Interfacial Fracture Mechanics.