

NUMERICAL SIMULATION OF FAILURE IN FIBER REINFORCED COMPOSITES

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ABSTRACT

This paper presents numerical results concerning the failure analysis of fiber-reinforced composites. In particular, damage initiation and progressive failure are considered. The numerical framework is based on the CUF advanced structural models and the component-wise approach. Such models are employed at all scales. In other words, the same structural framework is employed for macro-, meso-, and microscales. Two approaches are assessed, including direct numerical simulations via micromechanical homogenization analysis and two-scale analysis. The results are compared with those from literature and attention is paid to the evaluation of the computational efficiency of the present numerical framework. In fact, 3D-like accuracy is sought with a reduced computational effort.

Keywords: Failure, Multiscale, Finite Element, CUF