

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. Various approaches are assessed, including global-local strategies, direct numerical simulations, two-scale couplings, and homogenization techniques, see Fig.1. The results are compared with those from literature and particular 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.

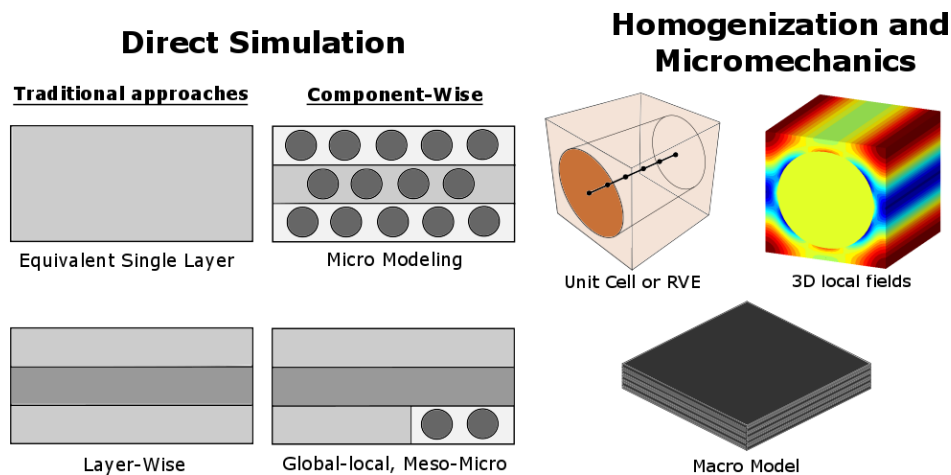


Figure 1: Assessed modelling strategies

Keywords: Failure, Multiscale, Finite Element, CUF