Generating Random Pattern for Homogenization of Fiber Reinforced Composites Using Memetic Algorithm

Peter Pecháč, Milan Sága, Lukáš Smetanka, Martin Močilan
University of Žilina, Univerzitná 1 Žilina 010 01, peter.pechac@fstroj.uniza.sk, milan.sagac@fstroj.uniza.sk, lukas.smetanka@fstroj.uniza.sk, martin.mocilan@fstroj.uniza.sk

The paper presents solution to random generation of fibers in composite materials for homogenization using representative volume. Randomly positioned fibers with random diameters of constrained sizes are generated within predefined representative volume, while minimal gap between fibers and volume ratio of fibers in the matrix is maintained. The problem of random generation is solved as an optimization problem using a custom memetic algorithm designed by the authors. A comparative study was performed, comparing performance of memetic algorithm and genetic algorithm.

Keywords: homogenization, composite, fibers

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