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Homogenization of Triply Periodic Elastic Media with Random Imperfections

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Triply periodic particulate matrix composites with random imperfect unit cells are analyzed by three new different versions of the multiparticle effective field method (MEFM, see Buryachenko, Appl. Mech. Review 2001, 54(1), 1-47). The first one is a generalization of the version of the MEFM proposed for the analysis of the perfect periodic particulate composites and based on the choice of a comparison medium coinciding with the matrix. The second one is a Monte Carlo simulation. The third method uses a decomposition of the desired solution on the solution for the perfect periodic structure and on the perturbation produced by the imperfections in the perfect periodic structure. The fundamentally new last method is based on the choice of a comparison medium coinciding with the perfect periodic structure.

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