



Testing the Predictive Capability of the High-Fidelity Generalized Method of Cells Using an Efficient Reformulation

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By Steven M Arnold

Bibliogov, United States, 2013. Paperback. Book Condition: New. 246 x 189 mm. Language: English . Brand New Book ***** Print on Demand *****.The High-Fidelity Generalized Method of Cells is a new micromechanics model for unidirectionally reinforced periodic multiphase materials that was developed to overcome the original model s shortcomings. The high-fidelity version predicts the local stress and strain fields with dramatically greater accuracy relative to the original model through the use of a better displacement field representation. Herein, we test the high-fidelity model s predictive capability in estimating the elastic moduli of periodic composites characterized by repeating unit cells obtained by rotation of an infinite square fiber array through an angle about the fiber axis. Such repeating unit cells may contain a few or many fibers, depending on the rotation angle. In order to analyze such multi-inclusion repeating unit cells efficiently, the high-fidelity micromechanics model s framework is reformulated using the local/global stiffness matrix approach. The excellent agreement with the corresponding results obtained from the standard transformation equations confirms the new model s predictive capability for periodic composites characterized by multi-inclusion repeating unit cells lacking planes of material symmetry. Comparison of the effective moduli and local stress fields with the...



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