PSEUDO-GRAIN DISCRETIZATION AND FULL MORI TANAKA FORMULATION FOR RANDOM HETEROGENEOUS MEDIA: PREDICTIVE ABILITIES FOR STRESSES IN INDIVIDUAL INCLUSIONS AND THE MATRIX

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Mori-Tanaka formulation is used to estimate the effective properties of short fiber composites.

Liu, Ferrari noted occasional mathematical problems with the Mori-Tanaka formulation. Doghri proposed pseudo-grain discretization to circumvent the problems of Mori-Tanaka formulation.

Aim: To compare the predictions of stresses in individual inclusions and matrix by both methods against results of full FE calculations.
• Finite element with 30 inclusions is built
• Periodic boundary conditions are applied
• Different configurations with different orientation tensor and lengths of RVE are considered

Mori-Tanaka formulation predicts correctly the stresses inside individual inclusion, while PGMT fails

The prediction of stresses in matrix is same for both methods.

Both methods predict average stresses over RVE, and thus similar predictions for effective properties are given.