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



Atul Jain

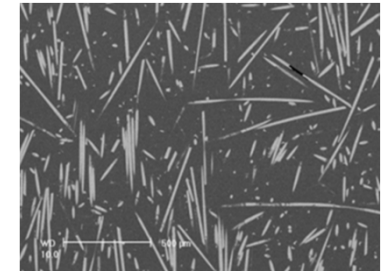
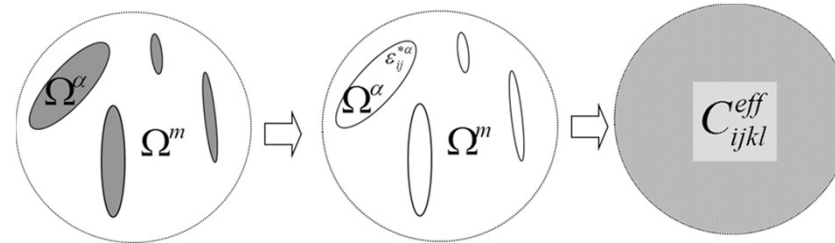
Stepan V. Lomov

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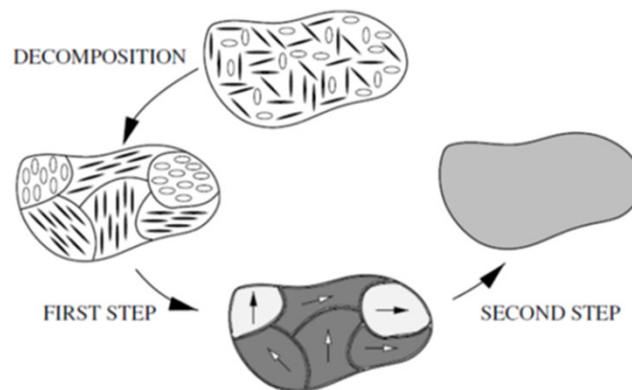
Wim Van Paepegem

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



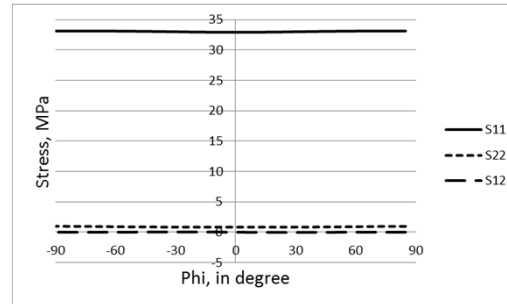
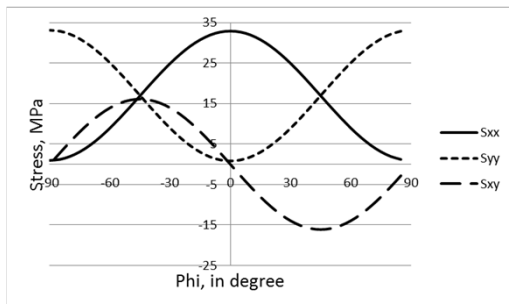
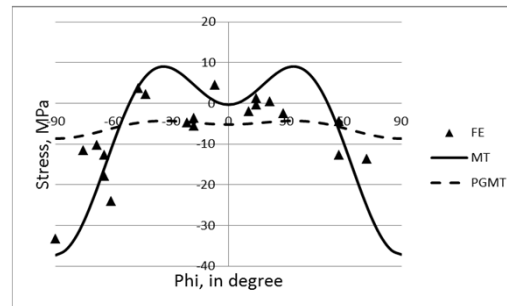
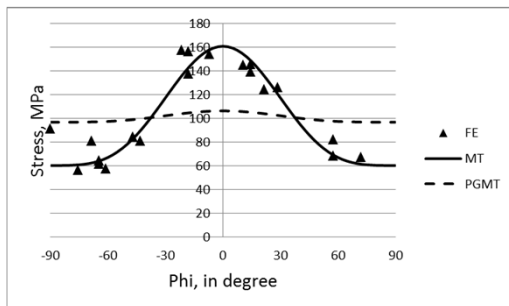
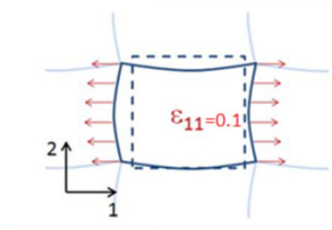
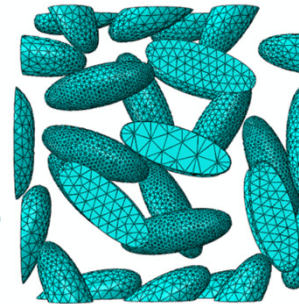
Liu, Ferrari noted occasional mathematical problems with the Mori-Tanaka formulation.

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