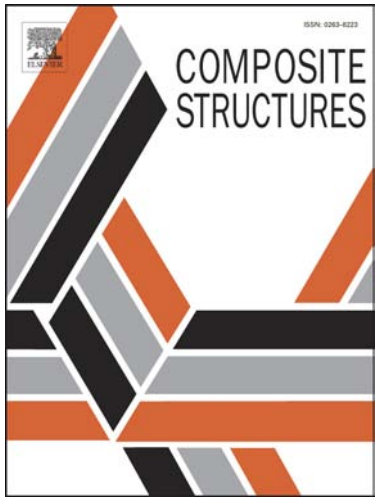

Numerical simulation on elastic properties of short-fiber-reinforced metal matrix composites: Effect of fiber orientation

Wenlong Tian, Lehua Qi, Changqing Su, Jiming Zhou, Zhao Jing

PII: S0263-8223(16)30602-X
DOI: http://dx.doi.org/10.1016/j.compstruct.2016.05.046
Reference: COST 7459

To appear in: *Composite Structures*

Received Date: 27 December 2015
Revised Date: 20 April 2016
Accepted Date: 14 May 2016

Please cite this article as: Tian, W., Qi, L., Su, C., Zhou, J., Jing, Z., Numerical simulation on elastic properties of short-fiber-reinforced metal matrix composites: Effect of fiber orientation, *Composite Structures* (2016), doi: http://dx.doi.org/10.1016/j.compstruct.2016.05.046

Numerical simulation on elastic properties of short-fiber-reinforced metal matrix composites: Effect of fiber orientation

Wenlong Tian[a, b], Lehua Qi[a, *], Changqing Su[a], Jiming Zhou[a], Zhao Jing[c]

[a]School of Mechanical Engineering, Northwestern Polytechnical University, Xi'an 710072, P.R.China

[b]Department of Civil and Environmental Engineering, Northwestern University, Evanston 60208, Illinois, USA

[c]School of Aeronautics, Northwestern Polytechnical University, Xi'an 710072, P.R.China

*Corresponding author. Tel.: +86-29-88460447, Fax: +86-29-88491982, E-mail address: qilehua@nwpu.edu.cn (Lehua Qi)

Abstract

To investigate the effect of fiber orientation on the effective elastic properties of short-fiber-reinforced metal matrix composites, the two-step mean-field homogenization procedures including the D-I/Reuss, M-T/Reuss, D-I/Reuss, M-T/Voigt and D-M/V-R models are introduced and the corresponding numerical implementations are detailed. Compared with the RVE based FE homogenization method, the two-step mean-field homogenization procedures: D-I/Reuss, M-T/Reuss, D-I/Reuss, M-T/Voigt and D-M/V-R models to predict the effective elastic properties of short-fiber-reinforced metal matrix composites are validated. The simulation results show that the axial effective elastic moduli E_{22} and E_{33} of short-fiber-reinforced metal matrix composites with the aligned fibers reach