Minisymposium 8 - Homogenisierung und Anwendungen

Homogenization of Strength, Fatigue and Creep Durability of Composites with Near Periodic Structure

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The composite macro-strength and -durability is estimated using the approximation to the micro-stress field, known from the asymptotic theory of homogenization, and presented in terms of a non-local strength and durability condition. The macro-strength and -durability functional over the homogenized stress-field is determined by micro-geometry, elastic and strength properties of the periodicity cell. The uniform in time convergence of the micro- to the macro-strength and -durability condition is also proved based on the two-scale convergence of the micro-stresses to their first approximation. The approach is applicable to the durability description at fatigue, creep, impact loading and their combination.

Reference: J. Orlik, Homogenization of strength, fatigue and creep durability of composites with near periodic structure, Mathematical Models and Methods in Applied Sciences, Vol. 15, No. 9(15), pp. 1329-1347, 2005.