

HOMOGENIZATION OF MULTISCALE MULTICONTINUUM SYSTEM

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We study a coupled system of locally periodic two scale time dependent partial differential equations that models the interaction of two continua. We show that the homogenized equations depend on the scaling of the interaction of the continua with respect to the microscopic scale. We study a particular scaling regime for which in the homogenization limit, the two continua converge to the same limit. We show the homogenization limit rigorously. We then study a hierarchical finite element method that solves the cell problems which forms a coupled system of partial differential equations of locally periodic coefficients, to compute the homogenized coefficients for a dense set of macroscopic points, with optimal computational complexity.

This is a joint work with Richard Jun Sur Park and Yalchin Efendiev (Texas A&M University)