Multiscale methods for Darcy, Stokes and wave equations: modeling, analysis and simulation

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In this talk we will present recent developments in the design and analysis of numerical homogenization methods. Recent results for linear and nonlinear problems that combine multiscale methods with reduced order modeling techniques such as the reduced basis method will be discussed. Multiscale methods involving different equations at the microscopic and the macroscopic levels will also be presented. In particular, numerical methods for Stokes flow and wave propagation in heterogeneous media over long time.

The works presented are joint works with various collaborators [1, 2, 3, 4, 5, 6].

Références

[1] A. ABDULLE AND Y. BAI, *Reduced basis finite element heterogeneous multiscale method for high-order discretizations of elliptic homogenization problems*, J. Comput. Phys., vol. 191, num. 1, p. 18-39, 2012.

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[3] A. ABDULLE AND G. VILMART, *Analysis of the finite element heterogeneous multiscale method for quasilinear elliptic homogenization problems*, Math. Comp. vol. 83, num. 286, 2014.

[4] A. ABDULLE, Y. BAI AND G. VILMART, *Reduced basis finite element heterogeneous multiscale method for quasilinear elliptic homogenization problems*, to appear in Discrete Contin. Dyn. Syst. 2014

[5] A. ABDULLE AND M.E. HUBER, *Discontinuous Galerkin finite element heterogeneous multiscale method for advectiondiffusion problems with multiple scales*, to appear in Numer. Math. 2014

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