

FFT-based computational homogenization methods

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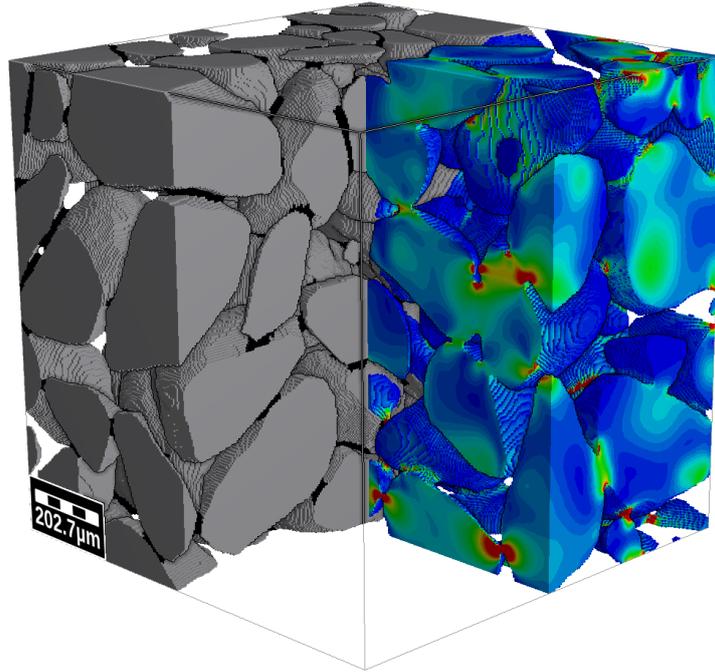


Figure 1: Microstructure and local stress field for a bound sand core microstructure [1]

Abstract:

Since the pioneering work of Moulinec-Suquet [2], computational methods based on the fast Fourier transform (FFT) have gained popularity for computing effective properties of materials with complex microstructures and nonlinear mechanical behavior.

In this talk, recent developments concerning nonlinear solution techniques and advances in discretization methods necessary for treating materials with high porosity are discussed, along with demonstrative examples.

References

- [1] M. Schneider, T. Hofmann, H. Andrä, P. Lechner, F. Etmeyer, W. Volk, and H. Steeb, “Modelling the microstructure and computing effective elastic properties of sand core materials,” *Int. J. Solid Struc.*, vol. 143, pp. 1–17, 2018.
- [2] H. Moulinec and P. Suquet, “A fast numerical method for computing the linear and nonlinear mechanical properties of composites,” *Comptes Rendus de l’Académie des Sciences. Série II*, vol. 318, no. 11, pp. 1417–1423, 1994.