

Homogenization in materials modeling - a selection of topics

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In this talks we present a (personalized) survey on mathematical homogenization theory and its application to materials modeling and mechanics. After a brief review of classical results and basic concepts, we discuss a selection of homogenization problems coming from materials modeling that feature randomness of the microstructure, nonlinearities and/or singular scalings. In particular, we address the topic of quantitative stochastic homogenization and simultaneous homogenization and dimension reduction in nonlinear elasticity.