

FIM

Nachdiplomvorlesung

HS 2020

Felix Otto (Max-Planck-Institut für Mathematik, Leipzig)

Stochastic homogenization

13 October - 15 December 2020 | Tuesdays, 10:15 - 12:00 | HG G 43 and live stream

In engineering applications, heterogeneous media are often described in statistical terms. This partial knowledge is sufficient to determine the effective, i.e. large-scale behavior. This effective behavior may be inferred from the Representative Volume Element (RVE) method. I report on last decades progress on the quantitative understanding of what is called stochastic homogenization of linear elliptic partial differential equations with random coefficient fields: optimal error estimates of the RVE method and the homogenization error, and the leading-order characterization of fluctuations. Methods connect to elliptic regularity theory, and in fact lead to a fresh look upon this classical area, and to concentration of measure arguments.

In this course, I try to be both self-contained and efficient, by focussing on simple situations. Some prior knowledge on linear elliptic equations and functional analysis will be more helpful than advanced knowledge on probability theory, beyond elementary concepts like expectation or variance.

More information: <https://math.ethz.ch/fim/activities/nachdiplom-lectures>.

