MINI-COURSE

INTRODUCTION TO HOMOGENIZATION THEORY

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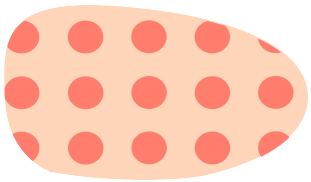
Abstract. In many problems of physics and mechanics processes in media with rapidly oscillating spatial local characteristics are studied. The typical examples are composite materials in which the physical processes are described by differential equations with highly oscillating (with respect to spatial variables) coefficients; see the figure, where the two-component material is depicted.



It is practically impossible to solve these problems either by analytical or numerical methods. However when the scale of the microstructure of the medium is much smaller than the scale of the physical process under consideration, the medium has homogenized characteristics (which, in general, differs from local ones). The problem of the homogenization theory is to find these characteristics and using them to construct the homogenized model approximating the initial one and giving global description of the physical process in microinhomogeneous media.

The proposed mini-course devoted to some basic problems and methods of the homogenization theory.

Duration: 5 lectures (90 minutes each)

Prerequisites: basic knowledge in functional analysis and partial differential equations are desirable, but they are not mandatory – all required objects will be briefly introduced through the course.

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