Abstract

Propagation in Multiscale Media

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Many studies consider media with *microstructure*, which has variations on some *microscale* l, while the *macroproperties*, on some *macroscale* L, are under investigation. It is assumed that $l \ll L$. To study such situations, the *effective medium* approximation is developed. Sometimes the medium has several microscales, all of them being much smaller than the macroscale L. Sometimes the variations on the macroscale are also included, which are taken into account by some procedures, like WKB. What if the medium has variations on all scales from microscale l to macroscale L? This situation occurs in several practical problems. This talk is about such situations, in particular, passive tracer in a random velocity field, wave propagation in a random medium, Schrödinger equation with random potential. To treat such problems we develop the Statistical Near-Identity Transformation. We obtain first Green's function and derive an integral-differential equation for the function N_k (the square of the Fourier coefficient it is a certain trace of second Green's function). Using them, we obtain physical implications.

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