

# Preface

Stochastic structure formation in random media is considered using examples of elementary dynamic systems related to the two-dimensional geophysical fluid dynamics (Gaussian random fields) and to stochastically excited dynamic systems described by partial differential equations (lognormal random fields). In the latter case, spatial structures (clusters) may be formed with a probability one in almost every system realization due to rare events happening with vanishing probability. Problems involving stochastic parametric excitation occur in fluid dynamics, magnetohydrodynamics, plasma physics, astrophysics, and radiophysics. A more complicated stochastic problem dealing with anomalous structures on the sea surface (rogue waves) is also considered, where the random Gaussian generation of sea surface roughness is accompanied by parametric excitation.

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