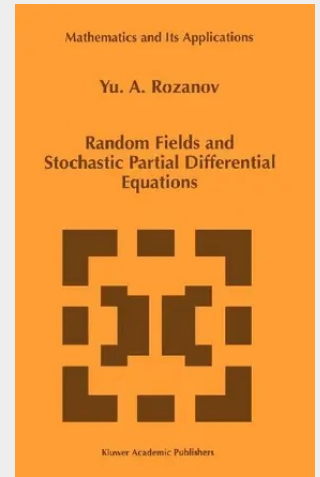


Random Fields and Stochastic Partial Differential Equations

This book considers some models described by means of partial differential equations and boundary conditions with chaotic stochastic disturbance. In a framework of stochastic Partial Differential Equations an approach is suggested to generalize solutions of stochastic Boundary Problems. The main topic concerns probabilistic aspects with applications to well-known Random Fields models which are representative for the corresponding stochastic Sobolev spaces. {The term "stochastic" in general indicates involvement of appropriate random elements. } It assumes certain knowledge in general Analysis and Probability (Hilbert space methods, Schwartz distributions, Fourier transform). A very general description of the main problems considered can be given as follows. Suppose, we are considering a random field $\sim$ in a region $T \sim \mathbb{R}^d$ which is associated with a chaotic (stochastic) source" by means of the differential equation (*) in T . A typical chaotic source can be represented by an appropriate random field" with independent values, i. e., generalized random function" = (φ , 'TJ), $\varphi \in C^{\sim}(T)$, with independent random variables (φ , 'fJ) for any test functions φ with disjoint supports. The property of having independent values implies a certain "roughness" of the random field " which can only be treated functionally as a very irregular Schwarz distribution. With the lack of a proper development of non linear analyses for generalized functions, let us limit ourselves to the 1 For related material see, for example, J. L. Lions, E.

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