



Valery A. Svetlitsky

Statistical Dynamics and Reliability Theory for Mechanical Structures

Series: Foundations of Engineering Mechanics

- To estimate reliability, durability, and lifetime of constructions and machines is an everyday design task. Here, theory as well as its practical application is presented from an engineering point-of-view

The monograph text is based on lectures delivered by author during many years for students of Applied Mechanics Department of Bauman Moscow State Technical University. The monograph includes also analytical results of scientific research obtained in collaboration with industry. Progress in developing new equipment has called for a better understanding of the physical peculiarities pertaining to the action of designed structures in real conditions. This is necessary for increasing the accuracy of the analysis and making these structures more reliable. It has been found that classical determined perturbations are not principal and that determinism-based methods of classical mechanics prove insufficient for understanding and explaining physical effects that arise at the operation of instruments located on moving objects, the vibration of rocket engines, the motion of a vehicle, and the action of wind and seismic loads. Therefore the necessity arose for devising a new physical model to analyze these dynamic processes and, in particular, for creating a new mathematical apparatus that would allow us to take into account non-deterministic external excitations.

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