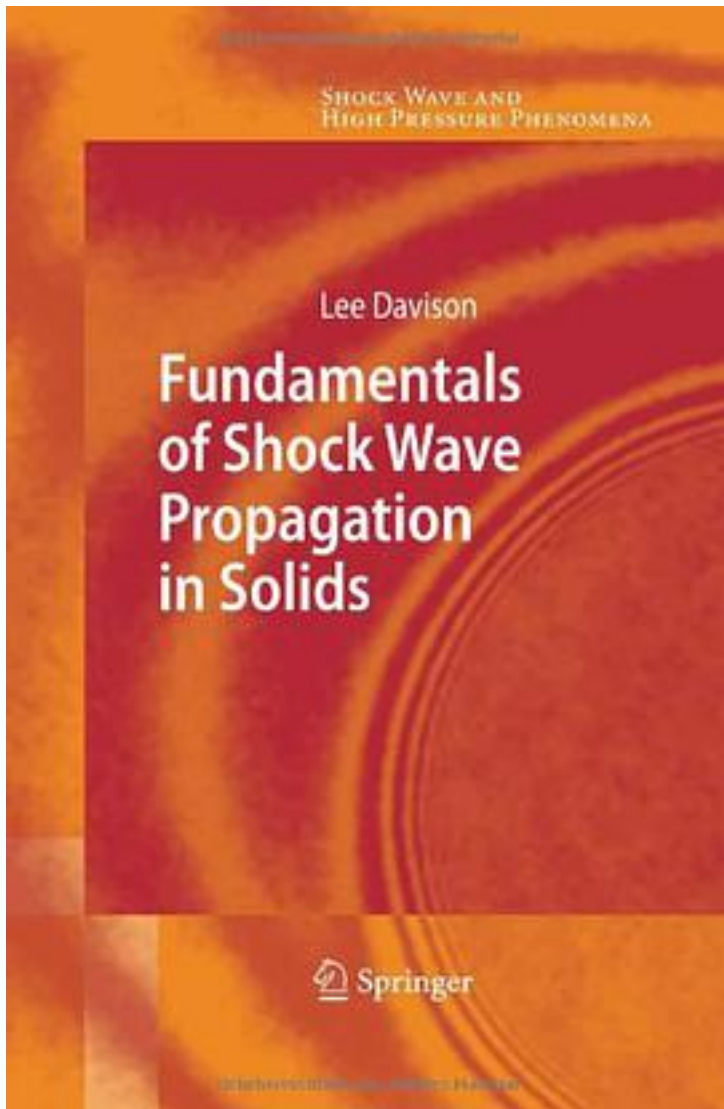


Fundamentals of Shock Wave Propagation in Solids



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This book forms an introduction to important aspects of shock-wave propagation in solid materials. Emphasis is on the regime of moderate compression that can be produced by high-velocity impact or detonation of chemical explosives. In this regime relatively simple equations of state are applicable to the description of compression. Solids may also experience inelastic flow, in which elastic plastic deformation becomes important. The theory provided is that required to conduct research in the field and to pursue its applications to ordnance development, Earth and planetary sciences, materials research, and other matters. The book includes a careful account of the kinematical and dynamical equations of the subject along with constitutive equations that describe the distinguishing responses of compressible fluids, elastic solids, and elastic - 'plastic and elastic' - viscoplastic solids. The discussion of wave propagation begins with elementary analyses of important problems of the propagation and interaction of plane longitudinal shocks. This is followed by more refined analyses of problems of plane-wave propagation in the aforementioned materials. Finally, spall fracture, wave propagation in porous solids, and detonation phenomena are discussed. Many illustrative problems can be solved without recourse to extensive numerical analysis. The text includes numerous exercises and detailed solutions to these exercises.

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