Ray theory: Its status in context of theoretical seismology

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Abstract

The purpose of this presentation is twofold. First, we show that in an anisotropic inhomogeneous Hookean solid wavefronts are tantamount to characteristic hypersurfaces of the elastodynamic equations. In doing so, we extend the definition proposed by Courant and Hilbert for the scalar wave equation. Second, we show that the Christoffel equations, which are the equations for wavefronts and equations from which the eikonal equations and the concept of rays emerge, are not linked intrinsically to an infinite-frequency formulation. Hence, ray theory is not an asymptotic theory, in the sense of an approximation, as it is commonly stated.