Hybrid wavefield estimation using asymptotic ray theory and finite difference method

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This paper explains a technique for wavefield estimation utilizing both the Asymptotic Ray Theory (ART) and a finite difference method (FDM). In this technique, a wavefield estimated using ART becomes an input to the finite difference method, which combines these two approaches for seismic modeling.

Finite difference method is known as a useful method in seismic wavefield estimation.

The algorithm for FDM is very simple and can be applied for a complex medium structure. However, the application of FDM requires much long time when there are zones of low seismic velocity.

The other method, ray tracing based on ART, has some advantages that it runs faster for a medium having non-complex structure than FDM.

This hybrid approach highlights the advantages in FDM in the estimation of wavefields in structurally complex part of a medium and that of the ray tracing in the efficiency of estimation in the other non-complex part of the medium.