

Joint inversion of refraction and gravity data for interface shape

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We first adopt finite-difference approximation to the eikonal equation for calculating arrival times of seismic refracted waves, because previous ray tracing codes include difficulties for finding ray paths of head waves, but the finite-difference algorithm can calculate them accurately together with those of direct, reflected, or diffracted waves in arbitrarily complex velocity models. We then add a special algorithm for calculating traveltimes in a region where two or more waves encounter each other. Without this algorithm, wavefronts are severely distorted and rays cannot be calculated.