Least-squares reverse-time migration toward "true" reflectivity

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Abstract

Conventional least-squares reverse time migration (LSRTM) usually aims to improve the quality of seismic image, by removing the acquisition footprint, suppressing migration artifacts, and enhancing resolution. We find that the conventional reflectivity defined in the LSRTM is related to the normal-incidence reflection coefficient and the background velocity. Compared with the defined reflectivity, our inverted result is approximate. With reflected data, LSRTM is mainly sensitive to impedance perturbations. According to an approximate relationship between them, we reformulate the perturbation-related system into a pseudo reflection-coefficient related one. Then, we seek the inverted image through linearized iteration. With the assumption that the density varies gradually compared to the migration velocity, only the knowledge of the velocity is required, although the reflected waves are produced at impedance discontinuities. We validate our scheme using the 2D Marmousi synthetic dataset. © 2017 Geophysical Press Ltd.

Author keywords

Linear Inversion  LSRTM  Normal-incidence reflection coefficient
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