

PRINCIPLE OF FULL ELASTIC PRE-STACK TWO-WAY WAVE EQUATION MIGRATION (B-32)

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Many modeling and migration schemes are based on forward and inverse extrapolation of the acoustic wave field, assuming that wave propagation is described by one-way wave equations for downgoing and upgoing waves, respectively. With respect to this approach the following should be noted:

- finite-difference schemes are dip-limited due to the implicit square root operator;
- additional effort is required at layer interfaces for the incorporation of multiple reflections, transmission effects and wave conversion.

In this paper we will discuss a wavefield extrapolation operator based on the full elastic two-way wave equation. It will be shown that:

- finite-difference schemes are accurate up to 90 degrees because the square root operator is evaded;
- multiple reflections, transmission effects and wave conversion are automatically incorporated because the total elastic wave field is continuous at layer interfaces.

Modeling and migration schemes based on these operators will be discussed. Finally the algorithms will be illustrated on synthetic examples for 1-D inhomogeneous elastic media. It will be shown that with the aid of the full elastic two-way wave equation migration scheme the angle-dependent P-P and P-SV reflectivities can be recovered independently.

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