A Framework for Linear and Nonlinear Converted Wave Time-Lapse Difference AVO

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Abstract

Multicomponent time-lapse amplitude-variation-with-offset (AVO) may improve approximating time-lapse difference data. The difference data during the change in a reservoir from the baseline survey relative to the monitor survey are expressed for converted wave. We define a framework for the difference data in order of both baseline interface contrast and time-lapse changes. The higher order terms represent corrections appropriate for large contrasts. We conclude that in many plausible time-lapse scenarios the increase in accuracy associated with higher order corrections is non-negligible for converted wave as well as P-wave. Furthermore coupling between baseline and time-lapse quantities is non-negligible when contrasts are large.

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