

## **MODELING OF AN ANISOTROPIC AND HETEROGENEOUS RESERVOIR USING THE RAY METHOD**

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A complex six-layered model approximating a field of the Campos Basin was constructed in this work. Some of the layers are inhomogeneous and/or anisotropic. The uppermost layer represents the sea (acoustic medium). Immediately below it is an isotropic layer with a vertical gradient of velocities, representing a sedimentary sequence above the reservoir. Below is a shale simulated by a transversally isotropic medium with vertical axis of symmetry. The sandstone reservoir located between two layers of shale, is isotropic. A fractured zone with lateral variation of its intensity is introduced to the described model. Portions of shales affected by vertical fractures are modeled as a medium of orthorhombic symmetry. Its elastic properties vary in accordance with the degree of fracturing. Portions of sandstone affected by vertical fractures vary laterally from isotropic to transversally isotropic with horizontal axis of symmetry. This model was characterized by the behaviour of phase velocities and reflection coefficients in all layers and served as a basis for an analysis of data obtained by ray modelling for various acquisition geometries in the fractured medium. For 3D surveys an observation was made that the NMO (normal moveout) correction made for a unique direction could be responsible for errors of up to 4ms in the reflector position and of upto 38% in its maximum amplitude. For cross-well geometry, the azimuth of the survey implies variations of up to 14ms for the qP wave. The transverse component of displacement of the qP wave is most sensitive to the presence of fractures.