A Petroelastic Modeling for Simulator to Seismic approach.

Maurício Laurindo de Matos, Fernando Sergio de Moraes

Reservoir simulation and time-lapse seismic provide complementary information. These two techniques combined can help to improve the knowledge about the reservoir behavior. A valuable tool employed in reservoir management is the simulation to seismic modeling, a forward technique used to generate synthetic seismic response from a reservoir model. It is composed of two key processes: first, the results of flow simulation are converted to elastic properties through the petroelastic model, and second, seismic modeling is employed to generate the synthetic seismic. In this work, we present a new simtoseis approach, using seismic AVO inversion information with reservoir simulator results to create mineral bulk modulus model and perform the petroelastic modeling. We focused this work on the petroelastic modeling step, describing its advantages and innovations. We employ an alternative method for calculating the physical properties of hydrocarbons and use machine learning techniques to convert spatial information between the seismic and simulator domains. The entire workflow is developed in an open source environment. The modeling is applied in the Norne field case study between the years 2001 and 2006. To evaluate the synthetic and real seismic data, the same sections are plotted and anomalies are interpreted along with saturation and pressure maps. The described workflow supports many applications, such as AVO analysis, seismic time-lapse survey design, reservoir characterization and monitoring.

Instituição do Programa de IC, IT ou PG: Universidade Estadual do Norte Fluminense Darcy Ribeiro