Reservoir Parameter Estimation from Joint Inversion of Marine CSEM and Seismic AVO Data Using the Genetic Algorithms

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Actually reservoir parameter estimation is of significant economic importance to the hydrocarbon industry, which can only be obtained from multi-source geophysical data. We present in this paper a global, GA, joint inversion algorithm for directly estimating reservoir parameters from using both seismic AVO and CSEM data. The presented GA is designed to deal with nonlinear optimization that objective function possesses no 'nice' properties. It has ability to escape from being trapped in the local minima, which is most likely the end up of the conventional local inversion algorithms. We suggest in the paper also a realistic well tie rock physics modeling scheme, which is used to establish the relationships between reservoir parameters and the field rock elastic (seismic) and electric (CSEM) parameters. Through a data example, Luva gas field, we demonstrate the power of the GA in retrieval of the reservoir parameters and its efficiency.