

Estimation of Reservoirs Fracture Network Properties Using an Artificial Intelligence Technique

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Abstract : The main objective of this study is to develop a subsurface fracture map of naturally fractured reservoirs by overcoming the limitations associated with different data sources in characterising fracture properties. Some of these limitations are overcome by employing a nested neuro-stochastic technique to establish inter-relationship between different data, as conventional well logs, borehole images (FMI), core description, seismic attributes, and etc. and then characterise fracture properties in terms of fracture density and fractal dimension for each data source. Fracture density is an important property of a system of fracture network as it is a measure of the cumulative area of all the fractures in a unit volume of a fracture network system and Fractal dimension is also used to characterize self-similar objects such as fractures. At the wellbore locations, fracture density and fractal dimension can only be estimated for limited sections where FMI data are available. Therefore, artificial intelligence technique is applied to approximate the quantities at locations along the wellbore, where the hard data is not available. It should be noted that Artificial intelligence techniques have proven their effectiveness in this domain of applications.

Keywords : naturally fractured reservoirs, artificial intelligence, fracture intensity, fractal dimension

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