Abstract

The fracture porosity is estimated especially through the log data (density, neutron porosity and transit time) and the characteristics of the mud (fluid density, transit time of the saturating fluid). If one of these parameters is lacking, the estimation of the natural fracture porosity using log data becomes impossible. The problem found in the study area of the Hassi Messaoud oil field is that the transit time is missing in many wells, which makes the calculations of the natural fracture porosity difficult. A methodology is proposed in this paper to estimate this parameter by means of fuzzy ranking and artificial neural network (ANN) using four conventional log data (deep resistivity, density, neutron porosity and gamma ray) from well#1 and well#2 in Hassi Messaoud oil field.Fuzzy ranking is used to rank the log data input with the degree of influence at the desired output of the ANN, the results obtained confirm that all data used by ANN are important and we cannot neglect any one. The structure of the ANN was trained using the back-propagation algorithm, the training was retained when the number of epochs is equal to 1000 and the mean squared error is equal to 0.001. The correlation coefficient (R^2) between the natural fracture porosity obtained from ANN and log data is equal to 0.878.The methodology presented in this paper can serve for the prediction of natural fracture porosity from well log data when the transit time or the characteristics of the mud are unknown in the oil wells