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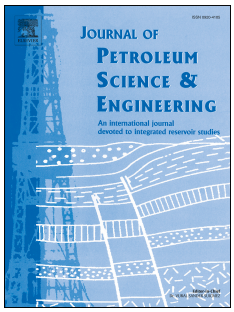

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M. koolivand Salooki, M. Esfandyari, E. Rabbani, M. Koulivand, A. Azarmehr

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Application of Genetic Programing Technique for Predicting Uniaxial Compressive Strength Using Reservoir Formation Properties

M. koolivand Salooki[1], M. Esfandyari[2*], E. Rabbani[3], M. Koulivand[4] A. Azarmehr[5]

1-Gas Research Division, Research Institute of Petroleum Industry (RIPI), West Blvd. Azadi Sports Complex, Tehran, Iran
2- Department of chemical engineering, University Of Bojnord, Bojnord, Iran
3- Department of Petroleum Engineering, Islamic Azad University, Omidiyeh Branch, Iran
4-Chemical engineering department, Borujerd branch, Islamic azad university, Borujerd. Iran
5- Engineering and Development Department, Bidboland Gas Refining Company, Omidiyeh,Omidiyeh, Iran.

Corresponding author email: M.esfandyari@ub.ac.ir

Abstract

In this study, we developed a relationship for Uniaxial Compressive Strength (UCS) based on total formation porosity, bulk density and water saturation using Genetic Programming (GP). The numerical values of these parameters, which offered rock UCS, were obtained by analyzing various logs including sonic, neutron, gamma ray and electric logs. The elastic moduli were calculated by analyzing compressional and shear sonic logs and using mathematical correlations. The rock UCS was then analytically calculated using the empirical Wang and Plumb correlations (Plumb R.A. 1994). In order to predict UCS of the formation rock using the GP technique, approximately 5000 data pointsassociated with 3 different wells in one of the Iranian oil fields were collected and analyzed. The data points associated with one of the wells were used to structure the GP model after being calibrated with some UCS data derived from core analysis while the other two sets of the data points were employed to test the accuracy of model's

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