Abstract

Permeability is the key parameter of the reservoir and has a significant impact on petroleum fields operations and reservoir management. In most reservoirs, permeability measurements
are rare and therefore permeability must be measured in the laboratory from reservoir core samples or evaluated from well test data. However, core analysis and well test data are usually only available from a few wells in a field. Unfortunately, coring every well in large fields is very expensive and uneconomical. This paper proposes an intelligent technique using a Takagi-Sugeno-Kang (TSK) fuzzy modeling approach based on subtractive clustering and particle swarm optimization (PSO) to predict reservoir permeability from well logs data. Subtractive clustering technique (SCT) is employed to identify fuzzy inference system. The radius of influence of cluster center ( ) in the SCT is selected by PSO. This intelligent technique is applied to predict permeability of Mansuri Bangestan reservoir located in Ahwaz, Iran utilizing available geophysical well log data. The performance of the technique is recorded in terms of MSE and value. The results showed that the proposed technique was well performed in predicting the reservoir permeability.

Reference


Index Terms

Computer Science
Fuzzy Systems
Key words

TSK Fuzzy Modeling
Particle Swarm Optimization

Subtractive Clustering

Permeability
Log Data