Abstract

Accurate and reliable production forecasting is certainly a significant step for the management and planning of the petroleum reservoirs. This paper presents a new neural approach called higher-order neural network (HONN) to forecast the oil production of a petroleum reservoir. In HONN, the neural input variables are correlated linearly as well as nonlinearly, which overcomes the limitation of the conventional neural network. Hence, HONN is a promising technique for petroleum reservoir production forecasting without sufficient network training data. A sandstone reservoir located in Gujarat, India was chosen for simulation studies, to prove the efficiency of HONNs in oil production forecasting with insufficient data available. In order to reduce noise in the measured data from the oil field a pre-processing procedure that consists of a low pass filter was used. Also an autocorrelation function (ACF) and cross-correlation
function (CCF) was employed for selecting the optimal input variables. The results from these simulation studies show that the HONN models have enhanced forecasting capability with higher accuracy in the prediction of oil production.

References

Production Forecasting of Petroleum Reservoir applying Higher-Order Neural Networks (HONN) with Limited Reservoir Data

Index Terms

Computer Science

Artificial Intelligence

Keywords

Production forecasting  reservoir performance  higher-order neural network  higher-order synaptic operation
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