

Porosity and prediction from wireline logs using backpropagation artificial neural network.

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Deskripsi Lengkap: <https://lib.ui.ac.id/detail?id=20176984&lokasi=lokal>

Abstrak

Estimation of porosity (and other petrophysical parameters) from well logs are important yet difficult task encountered in geophysical formation evaluation and reservoir engineering. Motivated by recent result of artificial neural network (ANN) modelling offshore eastern Canada and North sea, we have developed neural nets for converting well logs in the Field-X, West Java, to porosity. We use back propagation artificial neural network (BPANN) to model porosity of the area. The porosity ANN is a simple three layer network using sonic, density and resistivity logs for input. Optimum network's parameters, like type of activation function, number of facts, and number of neurons also have been investigated through series of trials and errors of network. The network, initially developed for basin-scale problems, perform sufficiently accurate to meet normal requirements. There is strong similarity ($R=0.964$) between the predicted porosity from BPANN with density-derived porosity (which has been used as a substitute for core plug porosity due to not enough core data available). A major advantage is that no a priori knowledge of the rock material and pore fluids is required. Real-time conversion based on measurements while drilling (MWD) is thus an obvious application.