# Abstract

In the well-log data processing, the principal advantage of the nuclear magnetic resonance (NMR) method is the measurement of fluid volume and pore size distribution without resorting to parameters such as rock resistivity. Preliminary processing of the well-log data allowed first to have the petrophysical parameters and then to evaluate the performances of the transverse relaxation time $T_2$ NMR. Petrophysical parameters such as the porosity of the formation as well as the effective permeability can be estimated without having recourse the fluid type. The well-log data of five wells were completed during the construction of intelligent models in the Saharan oil field Oued Mya Basin in order to assess the reliability of the developed models. Data processing of NMR combined with conventional well data was performed by artificial intelligence. First, the support vector regression method was applied to a sandy clay reservoir with a model based on the prediction of porosity and permeability. NMR parameters estimated using intelligent systems, i.e., fuzzy logic (FL) model, back propagation neural network (BP-NN), and support vector machine, with conventional well-log data are combined with those of NMR, resulting in a good estimation of porosity and permeability. The results obtained during the processing are then compared to the FL and NN regression models performed by the regression method during the validation stage. They show that the correlation coefficients $R^2$ estimated vary between 0.959 and 0.964, corresponding to the root mean square error values of 0.20 and 0.15.