A New Correlation For Predicting Hydrate formation temperature Using Artificial neural network

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Gas hydrates are a costly problem when they plug oil and gas pipelines. The best way to determine the Hydrate Formation Temperature (HFT) and pressure is to measure these conditions experimentally for every gas system. Since this is not practical in terms of time and money, correlations are the other alternative tools. There are a few numbers of correlations for specific gravity method to predict the hydrate formation. As the hydrate formation temperature is a function of pressure and gas gravity, an empirical correlation is presented based on the Hammerschmidt correlation for predicting the hydrate formation temperature. In order to obtain a new proposed correlation, 753 experimental data points have been collected from gas-gravity curves. This correlation is programmed and assessed with respect to its capabilities to match experimental data published in the literature under varying system conditions (i.e. temperature, pressure, and composition). The LINGO software has been employed for statistical analysis of the data. Accuracy of our correlation is more accurate than the Hammerschmidt correlation. In order to establish a method to predict the hydrate formation temperature, a new neural network has also been developed with the BP (back propagation) method. This neural network (IPS) model enables the user to accurately predict hydrate formation conditions for a given gas mixture, without having to do costly experimental measurements. It is found that the IPS neural network and the AUT correlation have the same results and are more accurate than the empirical correlation.

Keywords: hydrate temperature formation, AUT correlation, IPS neural network

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