ABSTRACT:

This paper presented a new prediction model of pressure–volume–temperature (PVT) properties of crudeoil systems using sensitivitybasedlinearlearningmethod (SBLLM). PVT properties are very important in the reservoir engineering computations. The accurate determination of these properties, such as bubble-point pressure and oil formation volume factor, is important in the primary and subsequent development of an oil field. Earlier developed models are confronted with several limitations especially their instability and inconsistency during predictions. In this paper, a sensitivitybasedlinearlearningmethod (SBLLM) prediction model for PVT properties is presented using three distinct databases while comparing forecasting performance, using several kinds of evaluation criteria and quality measures, with neural network and the three common empirical correlations. In the formulation used, sensitivity analysis coupled with a linear training algorithm for each of the two layers is employed which ensures that the learning curve stabilizes soon and behaves homogenously throughout the entire process operation. In this way, the model will be able to adequately model PVT properties faster with high stability and consistency. Empirical results from simulations demonstrated that the proposed SBLLM model produced good generalization performance, with high stability and consistency, which are requisites of good prediction models in reservoir characterization and modeling.