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Inter-well Connectivity Analysis and Productivity Prediction Based on Intelligent Connectivity Model

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Artificial neural networks (ANNs) are well known for its strong learning ability and have been widely used in the petroleum industry, such as history matching, production optimization and productivity forecast. However, ANNs are also a typical kind of "black box"models for their weakness in the model interpretability, causing their results less reliable than those from other physics based models. This paper proposes an integrated model named intelligent connectivity model (ICM), which incorporates ANNs with the material balance equation within a machine learning (ML) framework. ICM is a modular model, and each module keeps correspondence with each item in the material balance equation, improving the model transparency and generalization capability significantly. The results of simulation experiments show that ICM enables to generate comparable prediction results and provide more reasonable characterizations on inter-well connectivity than the classical physical model, and meanwhile ICM is more computationally efficient.

Time Block Preference

Time Block A (09:00-12:00 CET)

References

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