ANN-Based Detection of Gas Hydrate Formation

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The major points of extension:

* The extended paper contains figures and tables that were not included in the original paper due to the page number limit. (Fig. 7., Fig 9., Fig 13., Tab 2.)
* In the case of the first approach in addition to NNARX model (Neural Network Auto-Regressive X), NNOE model Neural Network Output Error) was also used in the extended paper. *Explanation: The original paper compares two approaches. In the first one, the formation of gas hydrate was studied in laboratory conditions. The gas hydrate formation can be determined from the pressure curve. Using the measurement results, a single ANN-based solution was created where the input is the differential pressure. In the second project, test measurements were performed with a field hydrate dosing and monitoring system. Using the measurement results, a multi-input ANN-based solution was developed, where the inputs are pressure, temperature, quantity and quality of inhibitor as these also influence hydrate formation. In both cases, a NNARX model was used.*
* The NNOE model and its results are presented in the extended paper.