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Towards accurate prediction and statistical quantification of two phase regimes through system identification and recurrent neural networks NASEEM ALI, BIANCA VIGGIANO, Portland State University, MURAT TUTKUN, Institute for Energy Technology, RAUL CAL, Portland State University — Two different multiphase flow regimes including slug and dispersed flows are considered here to apply system identifications and obtain reduced order models. Unlike the balanced decomposition, system identification extracts a linear state-space model from impulse response data without the use of adjoint information. The system identification model precisely captures the flow dynamics of the flow regimes. The model also provides state-space representation in terms of frequency by defining the transfer function. The system identification results are compared with that of the long-short term memory neural network to predict the state of the flow regimes.

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