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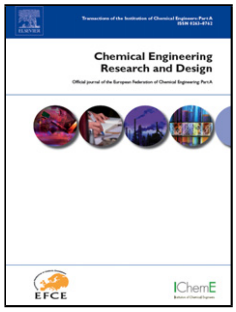

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Neuro Estimator-based Inferential Extended Generic Model Control of a Reactive Distillation Column

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Highlights

●An inferential extended generic model controller (IEGMC) is developed

●A neuro estimator and a soft sensor are coupled with IEGMC

●A reactive distillation is used to illustrate IEGMC scheme

Abstract

This work aims at proposing a neuro estimator (NE)-based inferential extended generic model controller (IEGMC) for an ethylene glycol reactive distillation (RD) column. This nonlinear control system comprises of a model-based controller (i.e., EGMC), an artificial neural network (ANN)-based estimator (i.e., NE) and an ANN-based soft sensor for composition inferencing. At first, the NE is designed for the RD column to compute the state variables exclusively required for simulating the control action of the EGMC. We subsequently formulate the NE-based EGMC controller. As a further development, a soft sensor has been proposed to infer the bottom composition of the RD column and the resulting controller in conjunction with this soft sensor is called NE-based inferential EGMC controller. For the representative ethylene glycol system, the bottommost tray has been identified as the most sensitive stage and thus, used to infer the composition. Performing