

Modified approach to distillation column control

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Abstract

This paper contains methodology research for forming the control algorithm for a distillation column, modeled as TITO (two-input two-output) process. Its modified form was obtained by connecting the two parts, and this combination hasn't been applied for such a industrial plant, until now. These parts include: a simplified decoupler which was first designed and decentralized PID controller obtained using D-decomposition method for such decoupled process. The decoupler was designed in order to make process become diagonal, and parameters of PID controllers are defined for the two SISO (single-input single-output) processes starting from relation between IE (integral error) criterion and integrator gain, taking into account desired response characteristics deriving from technological requirements of controlled plant. Their connecting provides centralized control. Analysis of the processes responses obtained by the proposed algorithm and their comparison with the results from the literature, were performed after the completion of the simulations. The proposed approach to the centralized controller design, beside its simplicity of usage and flexibility in achieving diversity of process dynamic behavior, gives better response characteristics, in comparison with existing control algorithms for distillation column in the literature.

Keywords: distillation column, decentralized controller design, decoupling control, PID control, D-decomposition, simulation.

