

Full cycle on-line autonomous reconfiguration control for heat exchanger networks

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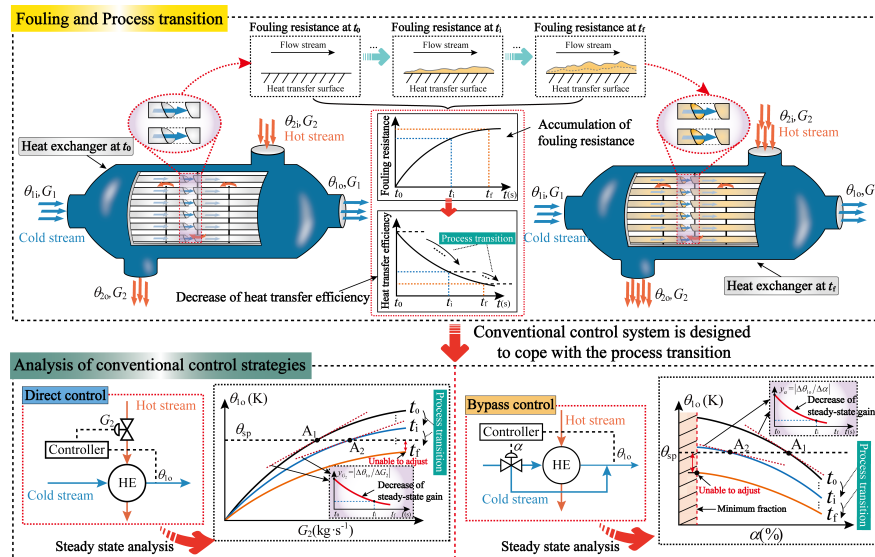
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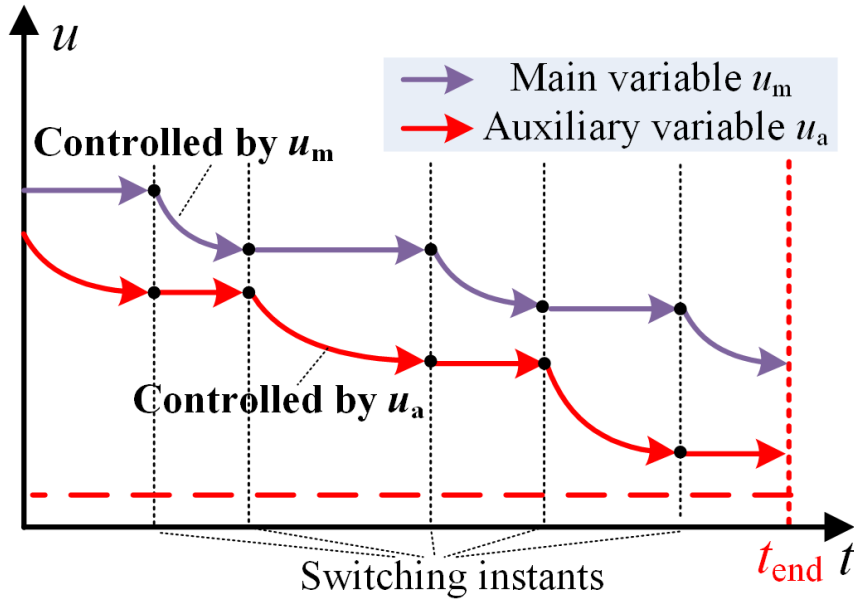
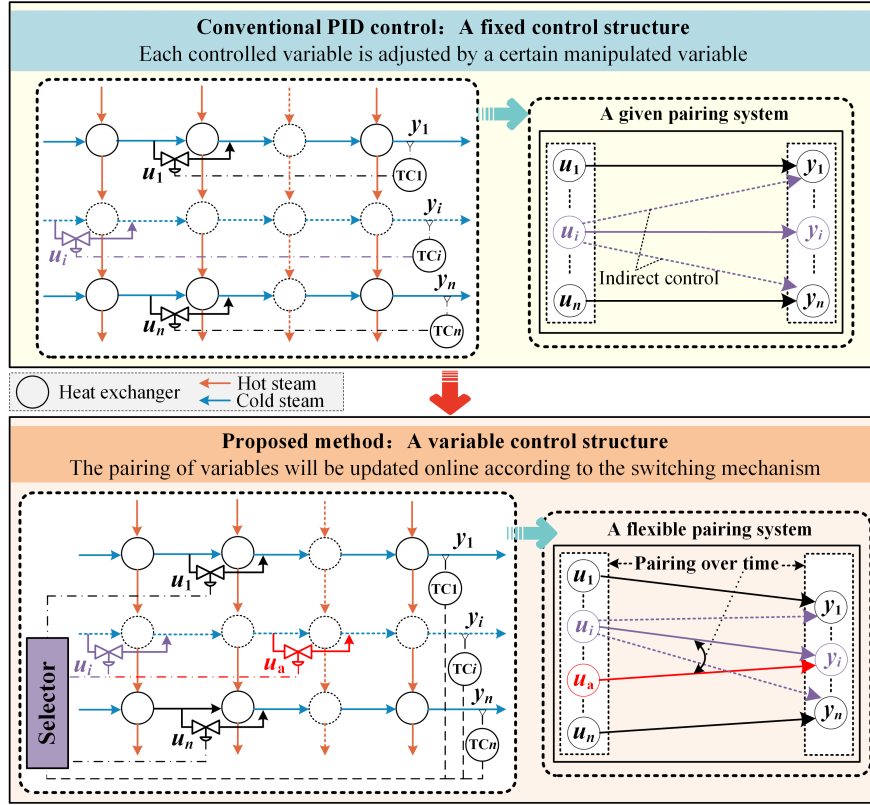
Abstract

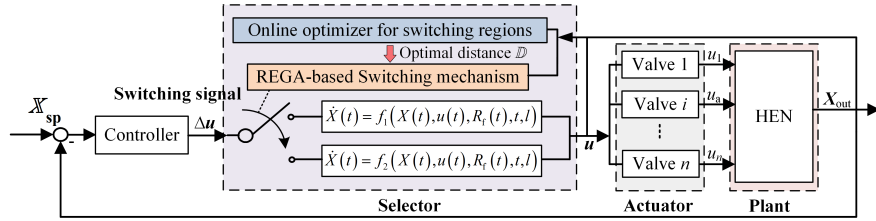
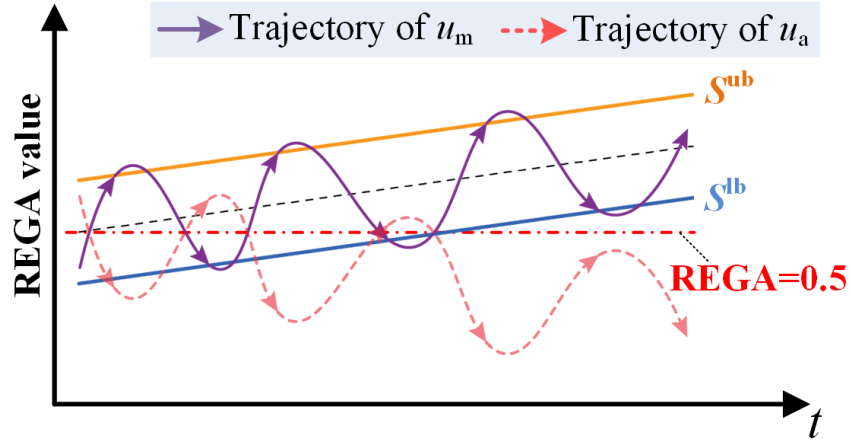
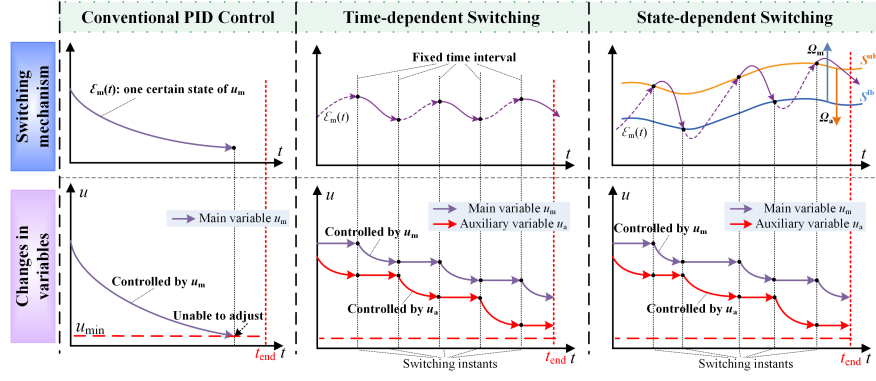
This study presents a novel autonomous reconfiguration strategy to achieve full cycle optimal control of the heat exchanger networks. The proposed method aims to select the optimal control structure online to solve the problem of slow time-varying process transition caused by the inevitable fouling accumulation. Specifically, an auxiliary variable is introduced to increase the degree of control freedom, and a flexible control structure is studied to provide appropriate pairings dynamically between variables. Subsequently, the nonparametric Relative Energy Gain Array is considered as the switching mechanism to determine switching instants of control loops. Furthermore, the online optimization of switching regions ensures the optimal control performance. Finally, one typical experiment for the heat exchanger network in crude distillation unit was conducted and the results illustrated the effectiveness of the proposed control method. Compared with the conventional control system, the available service time was extended by nearly 18 months.

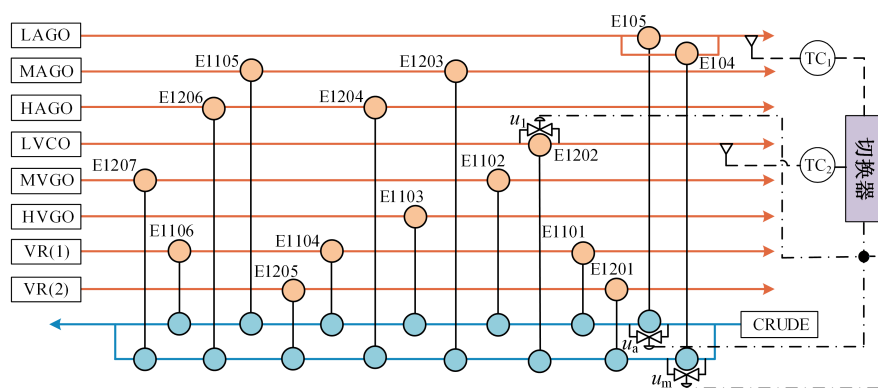
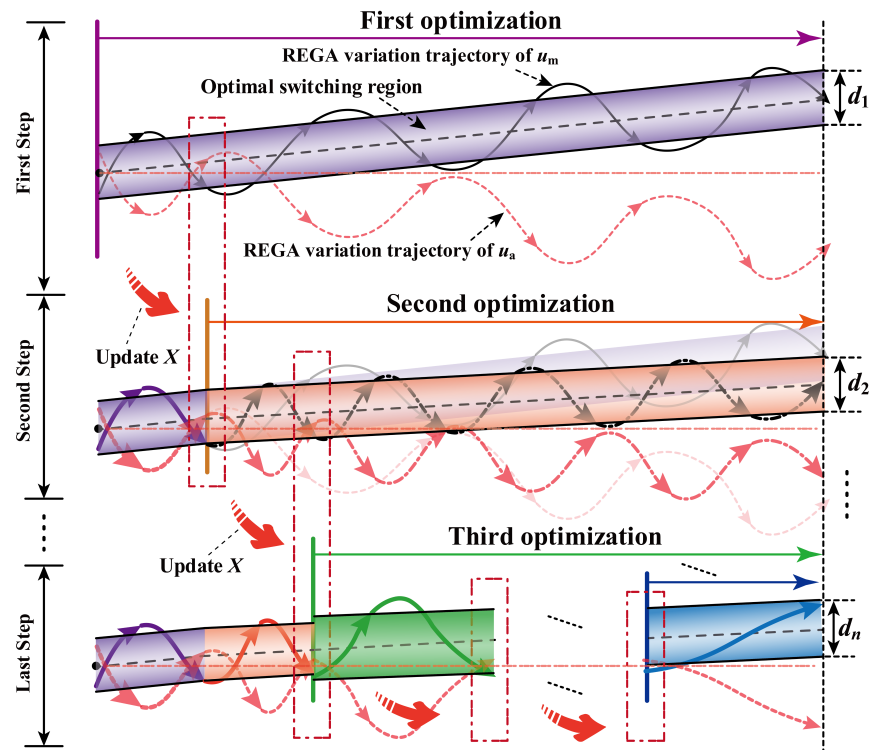
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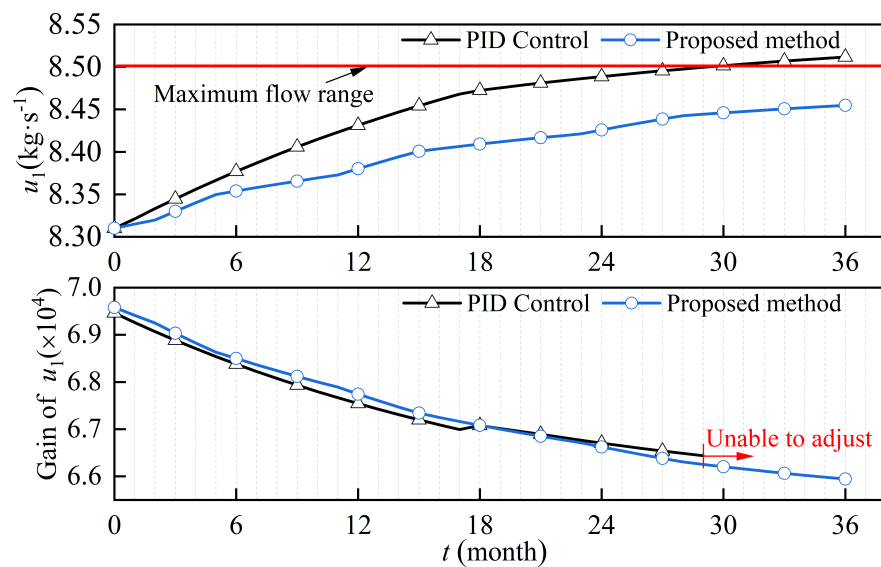
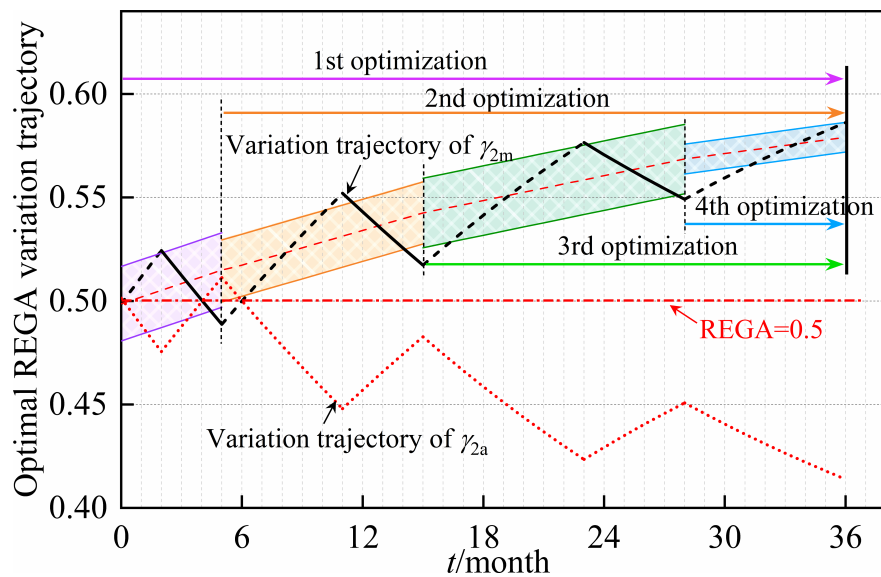
2_Manuscript.doc available at <https://authorea.com/users/600105/articles/631855-full-cycle-on-line-autonomous-reconfiguration-control-for-heat-exchanger-networks>

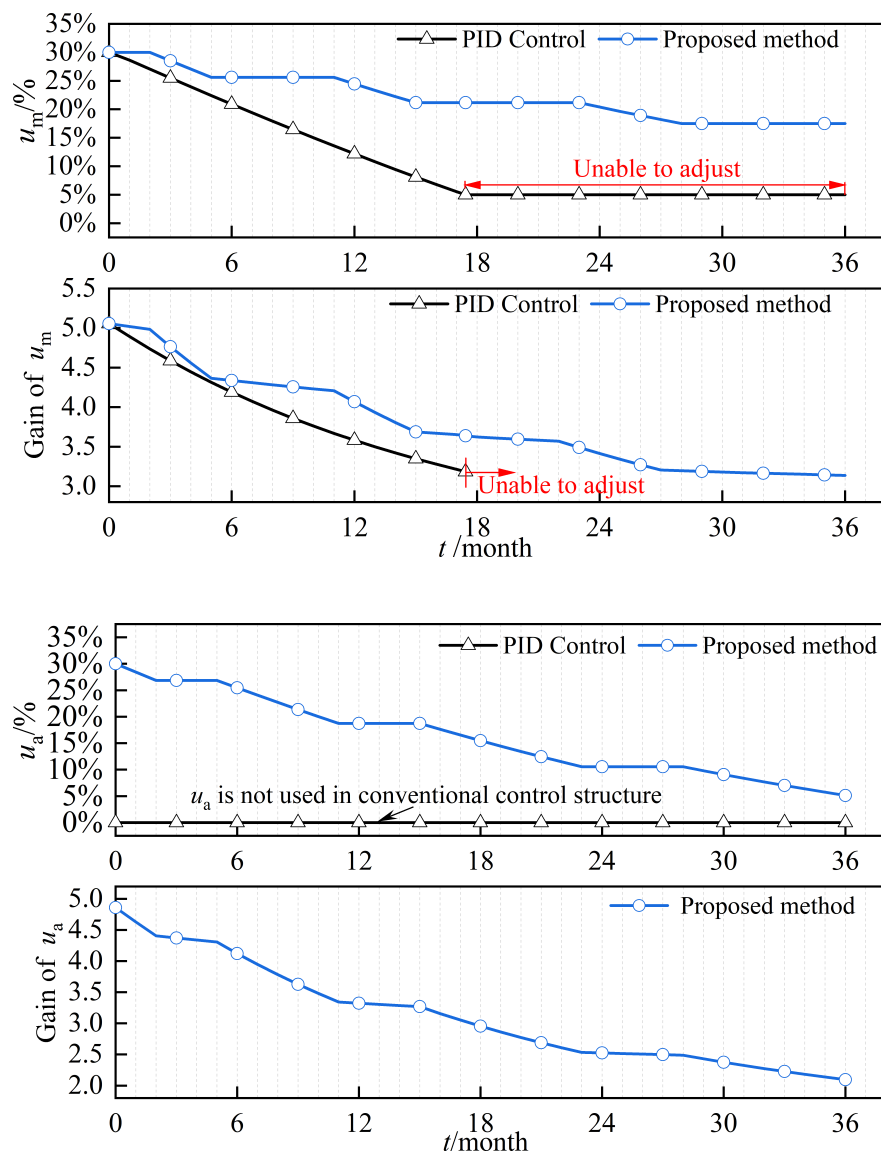












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3_Tables.docx available at <https://authorea.com/users/600105/articles/631855-full-cycle-on-line-autonomous-reconfiguration-control-for-heat-exchanger-networks>