An Intelligent Modeling and Controller design for Clarifier process: A Metaheuristic Algorithm approach.

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Abstract

This paper concentrates on the modeling and control of the sugar industry's nonlinear clarifier process. Since the sugar industry's clarification mechanism is complex and nonlinear, it is therefore important to obtain the exact model with identification methods. Using the normal modeling technique, the basic model of the complex process is obtained and further improved to make the model act like the actual system. The most accurate model from the algorithms is analysed using metaheuristic algorithms such as Genetic Algorithm (GA), Particle Swarm Optimization (PSO), and State Transition Algorithm (STA). The proposed STA design to the clarifier model provides the maximum fitness. The clarifier model derived from State Transition Algorithm (STA) behaves more similar to the actual clarifier process by capturing the principle dynamic qualities of the process. Simulations have demonstrated that STA is an optimum algorithm for the clarifier process than the other algorithms. From the results, it is inferred that the controllers introduced in this study, can be utilized to accomplish a better performance than the standard controller design, and during the control of any nonlinear procedure and STA is extremely helpful in modeling a nonlinear process.

Full Text

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