

# A genetic regulatory network-based sequencing method for mixed-model assembly lines

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## ABSTRACT

Mixed-model sequencing to minimize work overload at stations is regarded as one of the most concerned optimization problems in assembly lines manufacturing a variety of product models simultaneously. A novel sequencing method based on the genetic regulatory network is proposed to solve this problem. First, genes, gene regulation equations and gene expression procedures are developed in the network based on its similarity with the mixed-model sequencing problem. Each two-state gene represents a binary decision variable of the mathematical model. The gene regulation equations describe decision variable interactions in the constraints and objectives. The gene expression procedure depends on the regulation equations to generate solutions, in which the value of each decision variable is indicated by the expression state of the related gene. Second, regulatory parameter optimization in the regulation equations minimizes the work overload at stations. The effectiveness of the proposed method is validated through experiments consisting of reference instances and industrial instances. The experimental results demonstrate that this method outperforms other methods in large-scale instances.

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