A Creative Approach to Order Allocation and Sequencing Problems Using Genetic Algorithms and Simulated Annealing

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Abstract: This paper presents a creative Genetic Algorithm (GA) and a Simulated Annealing (SA) model for an order sequencing and allocation problem. The essential goals of order sequencing in manufacturing systems are effective use of capacity, minimization of set-up costs, and reliable delivery as well as prevention of late delivery. In the algorithms, the orders are allocated to the assembly lines in a way that similar orders will be manufactured in the same assembly line, and the orders in each assembly line are sequenced in a method which prevents late delivery. The models are mainly exposed to four hard constraints: available capacity, raw material receiving date, due dates, and order partitioning constraints. The proposed models use an objective function employing similarity coefficients among orders integrated with order capacity. The algorithms determine the most efficient production schedule and sequence that satisfies all four constraints via a maximization of similarity coefficients

Keywords: Genetic algorithm, scheduling, simulated annealing, similarity coefficient