

Simulation for Shop Floor Control

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Abstract

A shop floor control system (SFCS) is the central part of a CIM system used to control the activities of several pieces of manufacturing equipment (e.g., NC machines, robots, conveyors, AGVs, AS/RS). The SFCS receives orders and related process plans, and then performs selecting a specific process routing, allocating resources, scheduling the workpieces, downloading the processing instructions (e.g., RS-274 instructions for NC machines, VAL II programs for robot), monitoring the progress of activities, detecting and recovering from errors, and preparing reports on the status of the manufacturing system. Simulation has been utilized in discovering control policies used for resolving shop floor control problems such as resource contentions, part dispatching, deadlock. The simulation model must be designed to respond to real-time data coming from a shop floor. However, to rapidly build a realtime simulation model of SFCS cannot be easily accomplished. This talk is to address an automatic program generator of discrete event simulation model for shop floor control from process plans and resource models. The program generator is capable of constructing complete discrete simulation models for multi-product and multi-stage flexible manufacturing systems.

keyword: SFCS, Automatic simulation generator, Process plan and resource model