

The investigation of production variance in a module-based assembly system: A Markovian Arrival Process approach

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ABSTRACT

This paper provides an in-depth study of the assembly production variance problem through the largest supplier of General Motors China. We focus on the production variance problem in an unreliable assembly (MOBA) system with a finite inter-station buffer, focusing on two of the central issues, namely the output variance as well as the delivery schedule variance. We model every subsystem's departure procedure in the MOBA system using the Markov Arrival Process (MAP) approach. Through the approximate use of MAP, we successfully shorten the time needed to calculate the output variance as well as delivery schedule variance of a large-scale MOBA system, which improves the efficiency of the system while ensuring that it meets the customer's needs. The relationship between production variance and system parameters is also studied, which is of substantial significance for optimizing the productivity of MOBA systems and improving customer satisfaction.

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