

Service Time Modification and Capacity Planning with Service Interruptions in a Service System

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Abstract

There has been a burgeoning of literatures revealed that customer waiting is a key performance index of a service system, which is directly linked to customer satisfaction and the profitability of an organization. Therefore, an accurate customer waiting estimation is crucial for operation management. By queuing models, the expected waiting time of a system can be estimated, and the capacity of the system can also be determined.

Incapable events are the major factor of variation in a steady-state queuing system and, consequently, they are the critical factors in waiting time estimation and capacity planning. Machine failure modification, in particular, is always a critical element of cycle time estimation in a production system. In service systems, incapable events are usually modeled as service time deviation of a server. Nevertheless, service interruptions in a service system are more varied than production system. The duration and variation of each type of events are quite different. They must be aggregated before being modeled into service time deviation. It will result in inaccurately waiting time estimation if there are too many different types of interruption events.

This study presents a novel approach to analyze how customer waiting time influenced by service interruptions in a service system. In this model, each event is modeled as an individual parameter and directly affects the system. By modifying mean service time and SCV of service time, the customer waiting time and required capacity can be determined more correctly.

Keyword : Service interruptions, Customer Satisfaction, Capacity planning, Queuing Theory