

**System Planning and Configuration Problems  
for Optimal System Design**

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This paper addresses the issue of server allocation and customer partition that arise from designing a service system. The service system is modelled as a GI/G/m queueing system. In order to provide meaningful insights for system design, we consider two system design problems: the system planning problem and the system configuration problem. The former problem analyzes the tradeoff between investment cost and performance level while the latter problem examines the tradeoff between the system operating cost and the customer waiting cost. Both problems are formulated as dynamic programs that can be solved within polynomial number of operations.

*Keywords:* System Design, Resource Allocation, Dynamic Programming, Combinatorial Optimization, Queueing System.