

**ABSTRACT****A CHARACTERISTIC OF PRODUCTION RATE ON A SYSTEM  
WITH A SETUP MAN**

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A characteristic of maximum production rate on a system which consists of  $m$  different machines and one setup man is discussed. The maximum production rate can be realized when the average length of job queues on some or all of machines are infinite. In this paper, it is assumed that the average length of the every queue is infinite, that the setup time and machining time are drawn from exponential distributions with the different average for each machine, and that the preemptive priority discipline is not permitted. In this case, the system is regarded as a finite-source queue with  $m$  different customers. This paper obtains the following results.

- (1) Any production rate realized by employing a probabilistic priority discipline for setup lies on a convex hull which is a polyhedron on an  $m$ -dimensional vector space.
- (2) The vertices of the polyhedron are the production rates realized by employing the fixed priorities.
- (3) Any edge of the polyhedron is a lines connecting two production rates realized by employing the "adjacent" priorities.
- (4) It does not necessarily follow that the polyhedron is a hyperplane on the  $m$ -dimensional vector space.

These results may be important when a decision problem of the optimal priority is considered.