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Scheduling independent tasks to minimize the makespan on identical machines. (English)

Zbl 1335.90032

Probab. Eng. Inf. Sci. 9, No. 3, 447-456 (1995).

Summary: In this paper we consider scheduling n tasks on m parallel machines where the task processing times are i.i.d. random variables with a common distribution function F . Scheduling is done by an a priori assignment of tasks to machines. We show that if the distribution function F is a Pólya frequency function of order 2 (decreasing reverse hazard rate) then the assignment that attempts to place an equal number of tasks on each machine achieves the stochastically smallest makespan among all assignments. The condition embraces many important distributions, such as the gamma and truncated normal distributions. Assuming that the task processing times have a common density that is a Pólya frequency function of order 2 (increasing likelihood ratio), then we find that flatter schedules have stochastically smaller makespans in the sense of the “joint” likelihood ratio.

MSC:

90B35 Deterministic scheduling theory in operations research

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