Abstract: Predicting the cycle time distribution as a function of throughput is helpful in making a trade-off between workstation productivity and meeting due dates. To predict cycle time distributions, detailed models are almost exclusively used, which require considerable development and maintenance effort. Instead, we propose a so-called aggregate model to predict cycle time distributions, which is a lumped-parameter representation of the queueing system. The lumped parameters of the model are determined directly from arrival and departure events measured at the workstation. The paper demonstrates that the aggregate model can accurately predict the cycle time distribution of workstations in semiconductor manufacturing, in particular the tail of the distribution.

Keywords: cycle time distribution, discrete-event simulation, queueing, manufacturing systems, performance evaluation, factory dynamics

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