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Open and closed models for networks of queues. (English) Zbl 0594.90032
[AT&T Bell Lab. Tech. J. 63, 1911-1979 \(1984\).](#)

Summary: This paper investigates the relationship between open and closed models for networks of queues. In open models, jobs enter the network from outside, receive service at one or more service centers, and then depart. In closed models, jobs neither enter nor leave the network; instead, a fixed number of jobs circulate within the network. Open models are analytically more tractable, but closed models often seem more realistic. Hence, this paper investigates ways to use open models to approximate closed models. One approach is to use open models with specified expected equilibrium populations. This fixed-population-mean method is especially effective for approximately solving large closed models, where "large" may mean many nodes or many jobs. The success of these approximations is partly explained by limit theorems: Under appropriate conditions, the fixed-population-mean method is asymptotically correct. In some cases the open-model methods also yield bounds for the performance measures in the closed models.

MSC:

- [90B22](#) Queues and service in operations research
- [60K25](#) Queueing theory (aspects of probability theory)
- [60K20](#) Applications of Markov renewal processes (reliability, queueing networks, etc.)

Cited in **24** Documents

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[open and closed models](#); [networks of queues](#); [fixed-population-mean method](#)

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