

论文

# SYSTEM MODELING AND OPTIMIZATION OF A PORT SYSTEM WITH DIFFERENT SHIP'S KINDS

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**摘要** The analysis and evaluation of an actual port system containing R different ship's kinds and N subsystems each of which consists of  $M_i (i=1, 2, \dots, N)$  ports are derived. The external arrivals of ships to the system come from R different Poisson sources and the interarrivals to the queue of each port of a subsystem are determined according to condition probabilities. Each port has multiple berths whose service times are distributed according to Erlang probability distribution functions. Each port of a subsystem has R infinite capacity buffers for storing ships interarrived. This method provides a good approximation procedure for obtaining system performance measures such as waiting times of ships, average queue lengths, etc. Optimum port capacity can thus be evaluated by using this analysis. A simulation is also presented to test this approximate analysis, and a good agreement is observed. This model shall be used in the planning of several actual port systems. Through the application of this model, it is possible to analyze and evaluate performances of the systems.

**关键词** [Port system, queueing network, simulation](#)

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**Abstract** The analysis and evaluation of an actual port system containing R different ship's kinds and N subsystems each of which consists of  $M_i (i=1, 2, \dots, N)$  ports are derived. The external arrivals of ships to the system come from R different Poisson sources and the interarrivals to the queue of each port of a subsystem are determined according to condition probabilities. Each port has multiple berths whose service times are distributed according to Erlang probability distribution functions. Each port of a subsystem has R infinite capacity buffers for storing ships interarrived. This method provides a good approximation procedure for obtaining system performance measures such as waiting times of ships, average queue lengths, etc. Optimum port capacity can thus be evaluated by using this analysis. A simulation is also presented to test this approximate analysis, and a good agreement is observed. This model shall be used in the planning of several actual port systems. Through the application of this model, it is possible to analyze and evaluate performances of the systems.

**Key words** [Port system](#) [queueing network](#) [simulation and optimization](#)

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