

论文与报告

## GI/Gm排队系统梯度估计的一种新方法

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摘要

梯度估计是研究复杂离散事件动态系统的关键问题之一. 这里对GI/G/m排队系统提出一种新方法, 在一次采样(仿真)的基础上, 通过分析采样路径, 可得到性能指标关于参数的局部函数表达式. 由此可直接求导, 得到采样梯度, 并证明了由该方法得到的梯度估计的无偏性. 该方法计算量小、精度高, 还可以进一步拓广到其它系统上.

关键词 [局部函数表达式](#) [排队系统](#) [梯度估计](#) [无偏性](#)

分类号

## A New Approach to Estimate the Gradient of the GI/G/m Queuing Systems

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Abstract

Evaluating the performance gradient is an important issue in the study of the complicated discrete event dynamic systems (DEDS). In this paper we propose a new approach to determine the gradient for the GI/G/m queueing systems. Based on a single sample realization of the system, an explicit function expression of the performance measure in the vicinity of a given point of the parameter, i.e., Local Function Expression, is obtained by analysing the sample trajectory, and then the corresponding gradient is calculated by straightforwardly differentiating this function. Therefore, this method can give highly accurate estimation with less computation. The unbiasedness of the estimate is analytically proved. Furthermore, this approach can be extended to other DEDS.

Key words [Local function expression](#) [queueing system](#) [gradient estimation](#) [unbiasedness](#)

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