THE INITIAL TRANSIENT PROBLEM -- ESTIMATING TRANSIENT AND STEADY STATE PERFORMANCE

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RESEARCH SUMMARY

Deutsch and Richards (1983a,b,d,e) have derived the following consequences of ignoring initial transients in time series. The variance and autocovariance estimators are biased. As a result, the autocovariance and therefore autocorrelation functions may incorrectly represent the ARMA model, lead to model identification errors, and further bias variance and steady state expected value estimators. However, using transient data for steady state estimation is more economical than approaches which throw away transient observations (Deutsch and Richards 1983c,f).

In this paper, Deutsch, Richards and Fernandez-Torres (1983) fit relaxed time series (RARMA) models to transient and steady state data from a simulated M/M/1 queue and a non-stationary queuing network. Both systems are initially empty and idle. The statistical identification procedure (Richards 1983) for the RARMA model class is illustrated. Improved estimates of the steady state mean of the M/M/1, and of the polynomial in time of the network's nonstationary "steady state" performance, are obtained by including the identified transient model in the RARMA regression.

REFERENCES


