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Qmxd1() − Unfinished work tail distribution function

SYNOPSIS

#include <queuel.h>

double Qmxd1(double x, double rho, double *D, long lkm);

DESCRIPTION

delim $$ This function returns the unfinished work tail distribution for $M sup {x}/D/1$ queuing model.

Qmxd1() is a model for the $M sup{x}/D/1$ queuing system with Poisson batch arrivals and deterministic (constant) service time. *Rho* is the load level of the system. Parameter *x* is the amount of unfinished work in the system. Parameter *lkm* is the number of different batch sizes (1 - *lkm*) and parameter **D* is the distribution of these batch size probabilities. The sum of the probabilities has to be exactly 1.

ALGORITHM

$M sup {x}/D/1$ unfinished work tail distribution is calculated using the following recursive algorithm:

$1 - e sup {lambda x} sum from {0<=k<=N} {a sub k sup N}{(x-N) sup k}$, where

${a sub 0 sup (0)} = 1 - rho$

${a sub k sup (0)} = 0, 1 <= k <= N$

${a sub 0 sup (n)} = sum from {0<=k<=N} {a sub k sup (n-1)}$

${a sub k sup (n)} = -{1 over k} sum from {1<=i<=n} {beta sub i} {a sub (k-1) sup (n-i)}$ (If ${beta sub i}$ doesn't exist, the corresponding term is zero.)

$N = floor(x)$

ERRORS

When $ rho $ is close to 1, **Qmxd1()** may give inaccurate results.

SEE ALSO

COST 224: Performance evaluation and design of multiservice networks