

NAME**Mg1()** – Queue length probability function**SYNOPSIS****#include <queue.h>****double *Mg1(int x, double rho, double (*D)(double));****DESCRIPTION**

delim \$\$ This function returns the queue length probabilities for the *M/G/I* queuing model.

Mg1() is a model for the *M/G/I* queuing system with Poisson arrivals, and the service time *S* of a customer has a general probability distribution function *B(x)* with *B(0)=0*. It is assumed that the server utilisation $\{\rho = \lambda E(S)\}$ is smaller than 1. It is also assumed that $E(S)=1$.

ALGORITHM

M/G/I queue length probabilities are calculated using the following recursive algorithm:

$\{p_j\} = \{1 \text{ over } \{1 - \lambda \{a_0\}\} (\lambda \{a_{j-1}\} \{p_0\} + \lambda \text{sum from } \{1 \leq k \leq j-1\} \{a_{j-k}\} \{p_k\}), j = 1, 2, \dots\}$, where

$\{a_n\} = \{ \int_0^\infty \{e^{-\lambda t}\} \{(\lambda t)^n \text{ over } n!\} \{1 - B(t)\} dt, n = 0, 1, \dots\}$.

SEE ALSO

COST 224: Performance evaluation and design of multiservice networks