

**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  $M/G/1$  queuing model.

**Mg1()** is a model for the  $M/G/1$  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**

$M/G/1$  queue length probabilities are calculated using the following recursive algorithm:

$\{p_j\} = \{1 - \lambda \{a_0\}\} (\lambda \{a_{j-1}\} \{p_0\} + \lambda \sum_{1 \leq k \leq j-1} \{a_{j-k}\} \{p_k\})$ ,  $j = 1, 2, \dots$ , 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