

MODEL:

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! Model of a repair process for a finite set of machines,  
  that randomly break down and need repair;  
! Up times and repair times are assumed to follow exponential  
  distribution. The expected number of machines not in service  
  can then be computed by the Engset formula, implemented  
  as @PFS in LINGO;  
! This could also model a computer timesharing system serving  
  a finite set of users;  
! Keywords: @PFS, Engset, Exponential distribution, Finite source queue,  
  LINGO, Machine repair, MTBF, Queue, Repair;  
! The mean up time for each user (more  
  generally, Mean Time Between Failures in a  
  repair system);  
MTBF = 40;  
! The mean time to process each compute request  
  (more generally, Mean Time To Repair in  
  seconds);  
MTTR = 2;  
! The number of users;  
NUSER = 32;  
! The number of servers/repairmen;  
NREPR = 1;  
! The mean number of users waiting or in service  
  (more generally, the mean number of machines  
  down);  
NDOWN =  
  @PFS( MTTR * NUSER/ MTBF, NREPR, NUSER);  
! The overall request for service rate (more  
  generally, overall failure rate), FR, must  
  satisfy;  
FR = ( NUSER - NDOWN)/ MTBF;  
! The mean time waiting for or in service (more  
  generally, the mean time down), MTD, must  
  satisfy;  
NDOWN = FR * MTD;
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END