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HW3

**Problem 1**

Define , where N(1) is the maximum number of customers that will arrive to the store in an 1 hour interval.

Then, we have the following:

**Problem 2**

1. State space (given):

S = {(0, 0), (0, 1), (0, 2), (1, 0), (1, 1), (1, 2), (2, 0), (2, 1), (2, 2)}.

1. States of the CTMC that implies a flight crash: (0,0) (0,1) (0,2) (1,0) (2,0).
2. Rate Matrix:

(2,2)

(1,2)

(0,2)

(2,1)

(1,1)

(0,1)

(2,0)

(1,0)

(0,0)

**Problem 3**

Since machines, we have that by the given transition probability matrix P(9) .

Both worker will be busy if the system is on state 0, 1 or 2. Calculating for the long-run fraction of the time that both workers will be busy is the same as calculating the proportion of time the system will be in state 0,1 or 2. Therefore, we have to calculate for , and then add them.

then we have the following:

System of equations

Since we have N balanced equations, just N-1 will be independent. Therefore, to find each we will use equations . Solving in MATLAB: