

HOMEWORK 20 : JUAN PABLO ROYO SAZES.

PROBLEM 20.1

20.1.A

$$E[B] = \frac{1}{\lambda} \frac{1 - \pi_0}{\pi_0}$$

$$\lambda = \frac{1}{2}$$

$$T = 1$$

$$\pi_0 = 1 - \rho$$

$$\rho = \lambda T$$

$$\pi_0 = \frac{1}{2}$$

$$\rho = \frac{1}{2}$$

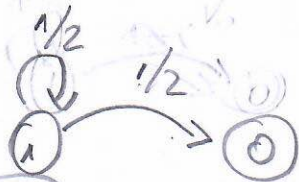
$$E[B] = 2 \frac{1 - 1/2}{1/2}$$

$$E[B] = 2$$

20.1.B

0: NO ~~at~~ IN SERVER

1: some ~~at~~ IN SERVER



20.1.C

$$m_{12} = 1 + \frac{1}{2} m_{11}$$

$$m_{12} = 2$$

Problem 20.2

20.2.A

$$W = \frac{\lambda E[S^2]}{2(1-P)} \quad P = \frac{1}{2}$$

$$W = \frac{1/2}{2 \cdot 1/2} = \boxed{\frac{1}{2}}$$

20.2.B

$$E[B] = 2 \frac{1/2}{1/2} = \boxed{2}$$

20.2.C

$$N = \lambda T \Rightarrow T = \frac{N}{\lambda} = \frac{P}{\lambda(1-P)} = \frac{1/2}{1/2 \cdot 1/2} = \boxed{2}$$

Problem 20.3

20.3.A

$$E[S_{M1}^2 + S_{M2}^2] = E[S_{M1}^2] + E[S_{M2}^2] = E[S^2]$$

$$E[S_{M2}^2] = \frac{1}{4^2} = \boxed{1}$$

$$E[S_{M1}^2] + 1 \leq 1$$

$$\lambda W \leq 1$$

$$\frac{1}{2} W \leq 1$$

$$\boxed{W \leq 2}$$

$$W = \frac{\lambda E[S^2]}{2(1-P)}$$

$$\lambda E[S^2] \leq 2(1-P)$$

$$E[S^2] \leq \frac{2(1-P)}{\lambda} \Rightarrow \boxed{E[S_{M1}^2] \leq 2(1-P) - 1}$$