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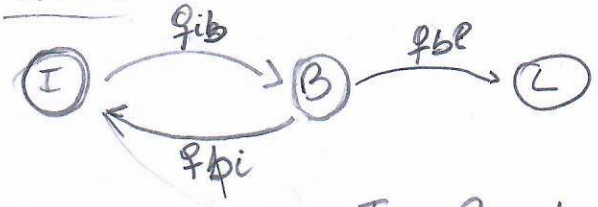
Homework 13

Problem 13.1.A

States:



$$Q = \begin{array}{c} \\ I \\ B \\ L \end{array} \begin{array}{c} \begin{array}{ccc} I & B & L \end{array} \\ \begin{bmatrix} -q_{ib} & q_{ib} & 0 \\ q_{bi} & -q_{bl} & q_{bl} \\ 0 & 0 & 0 \end{bmatrix} \end{array}$$

Prob 13.1.B

$$P(H_B > t) = e^{q_{ii}t} = \boxed{e^{-(q_{bl})t}}$$

Prob 13.1.C

$$P(\text{No of } H_L) = P(H_I \leq t)\, P(H_B \leq t)$$

$$= (e^{-(q_{ib})t})(1 - e^{-(q_{bl})t})$$

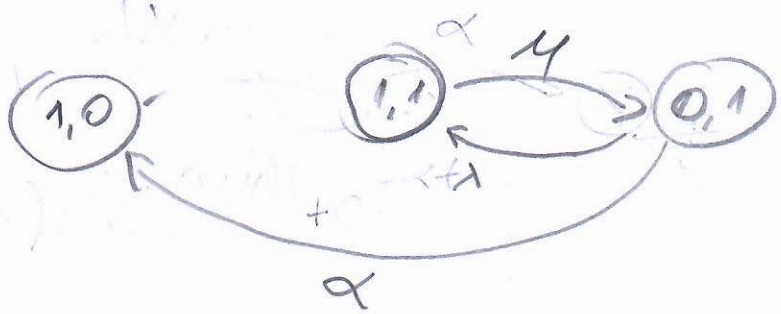
$$= \boxed{e^{-(q_{ib}+q_{bl})t}}$$

Prob 13.1.D

$$E[H_L] = \frac{1}{\lambda} = \boxed{\frac{1}{q_{ib}+q_{bl}}}$$

PROBLEM 13.2

13.2.A



	1,1	0,1	1,0
1,1	$-\mu$	μ	0
0,1	λ	$-(\lambda+\alpha)$	α
1,0	0	0	0

$$P((0,1) > t) = e^{-(\mu+\lambda+\alpha)t}$$

$$= e^{-\left(1+\frac{1}{4}+\frac{3}{4}\right)t}$$

$$= \boxed{e^{-2t}}$$

13.2.B

$$E[X] = \frac{1}{\mu+\lambda+\alpha}$$

$$E[X] = \frac{1}{1+\frac{1}{4}+\frac{3}{4}}$$

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