

Department of Mathematics
MTL 106 (Introduction to Probability Theory and Stochastic Processes)
Tutorial Sheet No. 9
Answer for selected Problems

1 . $P(\tau > t) = e^{-st}$

2 . $Q = \begin{bmatrix} -\lambda & \lambda & 0 \\ \mu & -(\lambda + \mu) & \lambda \\ 0 & 2\mu & -2\mu \end{bmatrix}$ Kolomogorov forward $\rightarrow P'(t) = P(t) \cdot Q$ Backward $\rightarrow P'(t) = Q \cdot P(t)$

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$$p_{ij}(t) = \begin{cases} 0 & i < j \\ e^{-\mu t} (\mu t)^{i-j} / (i-j)! & i \geq j. \end{cases}$$

8. $E_{0 \rightarrow 1} = 1/\lambda$

13. a) 8/9 b) 13/27 c) 1/3

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