

Classwork CE 5390/5710

Example The Two state Markov chain Consider a Markov chain $\{X(t)\}$ with state $\{0, 1\}$ whose infinitesimal matrix is

$$Q = \begin{matrix} & \begin{matrix} 0 & 1 \end{matrix} \\ \begin{matrix} 0 \\ 1 \end{matrix} & \begin{bmatrix} -\alpha & \alpha \\ \beta & -\beta \end{bmatrix} \end{matrix}$$

The Process alternates between states 0 and 1. The Sojourn times in state 0 are independent and exponentially distributed with parameter α . Those in state 1 are independent and exponentially distributed with parameter β . This is a finite state birth and death process for which $\lambda_0 = \alpha$, $\lambda_1 = 0$, $\mu_0 = 0$ and $\mu_1 = \beta$.