

Quiz 6

Consider the MC

$$P = \begin{matrix} & \begin{matrix} 0 & 1 & 2 \end{matrix} \\ \begin{matrix} 0 \\ 1 \\ 2 \end{matrix} & \begin{bmatrix} 0.1 & 0.3 & 0.6 \\ 0.1 & 0.6 & 0.3 \\ 0 & 0 & 1 \end{bmatrix} \end{matrix}$$

Starting in state 1, determine the mean time to absorption.

$$\text{Solution: } Q = \begin{bmatrix} 0.1 & 0.3 \\ 0.1 & 0.6 \end{bmatrix} \quad I - Q = \begin{bmatrix} 0.9 & -0.3 \\ -0.1 & 0.4 \end{bmatrix}$$

$$(I - Q)^{-1} = \begin{bmatrix} 0.4 & 0.3 \\ 0.1 & 0.9 \end{bmatrix} \frac{1}{0.36 - 0.03}$$

$$v = (I - Q)^{-1} \begin{bmatrix} 1 \\ 1 \end{bmatrix} = \frac{1}{0.33} \begin{bmatrix} 0.7 \\ 1.0 \end{bmatrix}$$

$$E[T \mid X_0 = 1] = \frac{1.0}{0.33}$$

