

# MMAT 5340 Assignment #7

Please submit your assignment online on Blackboard

Due at 12 p.m. on Wednesday, Nov 17, 2021

1. Consider a Markov chain  $X = (X_n)_{n \geq 0}$  with state space  $S = \{1, 2, 3, 4\}$  and transition matrix

$$A = \begin{bmatrix} 0.2 & 0.4 & 0 & 0.4 \\ 0.3 & 0 & 0.7 & 0 \\ 0.5 & 0 & 0.5 & 0 \\ 0 & 0.1 & 0.9 & 0 \end{bmatrix} \quad (1)$$

- (a) Which states are transient and which are recurrent?
  - (b) Is this markov chain irreducible or reducible?
2. Consider a Markov chain  $X = (X_n)_{n \geq 0}$  with state space  $S = \{1, 2, 3\}$  and transition matrix

$$A = \begin{bmatrix} 0.5 & 0 & 0.5 \\ 0 & 1 & 0 \\ 0.4 & 0 & 0.6 \end{bmatrix} \quad (2)$$

- (a) Which states are transient and which are recurrent?
- (b) Is this markov chain irreducible or reducible?