Practice worksheet | Matrix models

Repeated transitions

Name: _____ Date: _____

6 questions | 21 marks

1. Use rows $\begin{pmatrix} 0.8 & 0.3 \\ 0.2 & 0.7 \end{pmatrix}$ and initial $(100, 0)$. Find x_2. [3 marks]

2. For the same matrix, begin at $(0, 100)$. Find x_1, x_2. [3 marks]

3. For that matrix, verify that $(60, 40)$ is unchanged after two periods. [3 marks]

4. A swap matrix has rows $\begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$. Start at $(40, 10)$. Find the states after 5 and 6 periods. [3 marks]

5. Use T: $\begin{pmatrix} 0.8 & 0.3 \\ 0.2 & 0.7 \end{pmatrix}$, and U: $\begin{pmatrix} 0.6 & 0.1 \\ 0.4 & 0.9 \end{pmatrix}$, with $x_0 = (100, 0)$. [6 marks]

(a) Calculate UTx_0. [3 marks]

(b) Calculate TUx_0 and explain the difference. [3 marks]

6. Name two checks after computing $T^{20}x_0$ for a closed 500-person model. [3 marks]