Chapter 9 / **Example 11**

Initial state vectors

Dockless bicycle company Mathbike open their business by distributing a number of bicycles in a city according to the initial state vector $S_0 = \begin{pmatrix} 110 \\ 80 \\ 50 \end{pmatrix}$.

a Calculate the likely number of bicycles in each zone of the city after 5 days using the transition matrix given in example 10.

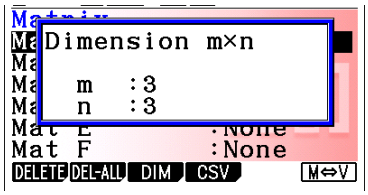
b Find the likely steady state of Mathbikes.

Enter the transition matrix $T = \begin{pmatrix} 0.50 & 0.30 & 0.10 \\ 0.30 & 0.35 & 0.30 \\ 0.20 & 0.35 & 0.60 \end{pmatrix}$.

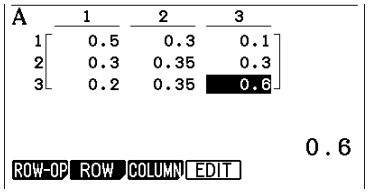
Press MENU 1 to display the Run-Matrix screen for arithmetical calculations.

Press F3 ▸MAT/VCT F3 DIM.

Change the dimensions of the matrix to 3 × 3 and press EXE.



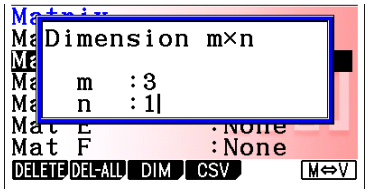
Enter the values of the elements of the matrix ***A***, using EXE to move through the matrix.



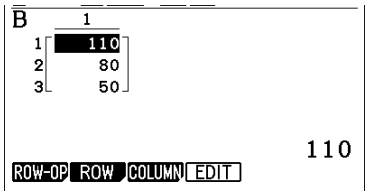
Press EXIT, select Mat B.

Press F3 ▸MAT/VCT F3 DIM.

Change the dimensions of the matrix to 3 × 1 and press EXE.

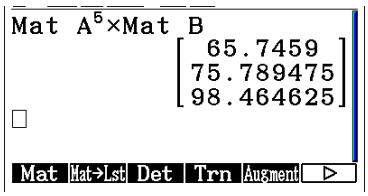


Enter the values of the elements of the matrix ***B***, using EXE to move through the matrix.



Chapter 9 / **Example 11**

Initial state vectors

Press EXIT twice to return to the calculation screen. Press OPTN F2 MAT/VCT F1 Mat. Press ALPHA X,θ,T [A]. Press ^ 5 press ▶ and press × . Press F1 Mat. Press ALPHA log [B] and press EXE. There would be approximately 66 Mathbikes in zone C, 76 in Zone I and 98 in Zone O.	
Repeat the calculation with some higher powers of the matrix. You can return to the entry line and change the value of the index. The system reaches an equilibrium at 65 bikes in C, 76 in I and 99 in O.