

[3.9] Replace matrix rows and columns

Sometimes you need to replace an entire matrix row with a different set of values. For example, suppose you have this matrix:

$$a = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$$

and you want to change the second row to [40, 50, 60]. This is easily done with

$$[40, 50, 60] \rightarrow a[2]$$

In this case, $a[2]$ is interpreted as the second row of matrix a . Now the matrix looks like this:

$$a = \begin{bmatrix} 1 & 2 & 3 \\ 40 & 50 & 60 \\ 7 & 8 & 9 \end{bmatrix}$$

Unfortunately, replacing columns is not so easy. There is a method that will work in most cases. Suppose we want to change the second column in the original matrix to [20, 50, 80]. These steps accomplish the change:

$$\begin{aligned} a^T &\rightarrow b \\ [20, 50, 80] &\rightarrow b[2] \\ b^T &\rightarrow a \end{aligned}$$

The basic idea is to use the matrix transpose operator, to convert the matrix columns to rows. Then, the new 'column' is inserted as a row. Finally, the transpose operator is used again to convert the matrix rows back to columns. Note that this will work even if the matrix elements are complex numbers.

(Credit for row replacement method to Glenn Fisher)