Lab 6 Exercise:: Numerical Python

1. Define a matrix A

$$A = \begin{pmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 10 \end{pmatrix}$$

and a vector $b = (-3, -2, -1)$. Please find a function in NumPy that computes the standard matrix-vector product A times b.

2. Extract the 2x2 matrix in the lower right corner of the matrix A in the first question as a slice. Add this slice to another 2x2 matrix B, multiply the result by a 2x2 matrix C, and insert this final result in the upper left corner of the original matrix A. Control the result by hand calculations. B and C are given as

$$B = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}, C = \begin{pmatrix} -1 & -2 \\ -3 & -4 \end{pmatrix}$$

3. Consider the following script:

```
from numpy import *
x = linspace(0,1,3)
# y = 2*x + 1:
y = x; y *= 2; y += 1
# z = 4*x -4:
z = x; z *= 4; z -= 4
print x, y, z
```

Explain what you observed. How can the script be changed such that y and z get the intended values?