

Section 7, Exercise 1

Let

$$a = \begin{pmatrix} 2 & 0 \\ 1 & 4 \end{pmatrix} \quad b = \begin{pmatrix} 0 & 2 \\ 5 & 3 \end{pmatrix}$$

What would be the result of `a*b` in Python?

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With proper matrix multiplication the answer is

$$ab = \begin{pmatrix} 2 & 0 \\ 1 & 4 \end{pmatrix} \begin{pmatrix} 0 & 2 \\ 5 & 3 \end{pmatrix} = \begin{pmatrix} (2)(0) + (0)(5) & (2)(2) + (0)(3) \\ (1)(0) + (4)(5) & (1)(2) + (4)(3) \end{pmatrix} = \begin{pmatrix} 0 & 4 \\ 20 & 14 \end{pmatrix}$$

However if you define these matrices in Python and do `a*b` you will get

$$a * b = \begin{pmatrix} (2)(0) & (0)(2) \\ (1)(5) & (4)(3) \end{pmatrix} = \begin{pmatrix} 0 & 0 \\ 5 & 12 \end{pmatrix}$$

Using `numpy.dot(a,b)` will give you the correct answer.

Section 7, Exercise 2

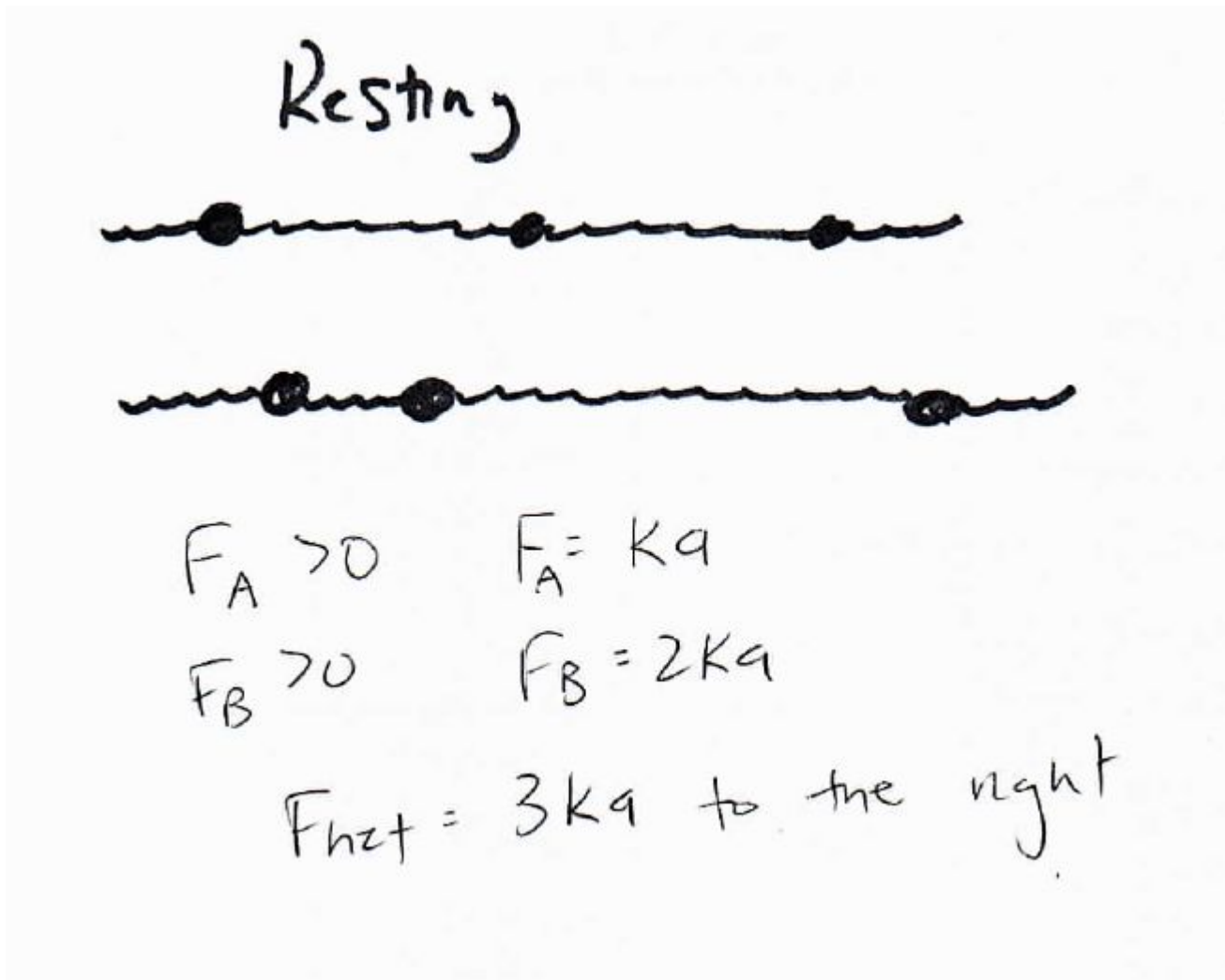
Give an example of a physics problem for which we would need to solve a system of equations.

Section 7, Exercise 3

Suppose spring A is compressed by a distance a and spring B is stretched by distance $2a$ (where $a > 0$). What is the magnitude and direction of the net force on the middle mass?

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Section 7, Exercise 4

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Find the vector \vec{u}_1 used in the QR decomposition.

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(0,2)

Section 7, Exercise 5

Solve the following equation using the relaxation method:

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```
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0.08632627817921663  
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18
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