DS 501: STATISTICAL AND MATHEMATICAL METHODS FOR DATA SCIENCE

Quiz 2

October 18, 2018

PROBLEM

1. Find the eigen values and eigen vectors of the following matrix:

$$\begin{pmatrix} 3 & 5 \\ 2 & 6 \end{pmatrix}$$

2. Write down an example of one vector that belongs to the span of the eigen vectors

SOLUTION

If λ is the eigen value then the characteristic equation involving λ is given by: (do the working yourself)

$\lambda^2-9\lambda+8 = 0$
Solving for λ gives
$\lambda = 8,1$

The of corresponding eigen vectors are:

$$\begin{pmatrix} 1 \\ 1 \end{pmatrix} \quad \text{and} \quad \begin{pmatrix} 5 \\ -2 \end{pmatrix}$$

You can also normalize the above vectors to get

$$\begin{pmatrix} 1/\text{sqrt}(2) \\ 1/\text{sqrt}(2) \end{pmatrix} \quad \text{and} \quad \begin{pmatrix} 5/\text{sqrt}(29) \\ -2/\text{sqrt}(29) \end{pmatrix}$$