Lecture 34: Perron Frobenius

We check Perron Frobenius for symmetric 3×3 matrices of the following type:

$$A = \begin{bmatrix} 2 & a & 1 \\ a & 2 & a \\ 1 & a & 2 \end{bmatrix}$$

where a is a positive number.

1   Verify that 1 is an eigenvalue by checking that $[1, 0, -1]^T$ is an eigenvector.

2   Does the matrix have only real eigenvalues?

3   What is the sum of the eigenvalues?

4   Verify that the determinant is $6 - 2a^2$.

5   What is the Perron-Frobenius eigenvalue in the case $a = 1$?