1 Additional Homework

Let

$$A = \begin{pmatrix} 3 & -1 \\ -5 & 7 \end{pmatrix}$$

Consider characteristic polynomial of A

$$p(A)(\lambda) = \begin{vmatrix} \lambda - 3 & 1 \\ 5 & \lambda - 7 \end{vmatrix}$$

Then, $p(A)(\lambda) = \lambda^2 - 10\lambda + 16$ Eigenvalues of A satisfy $p(A)(\lambda) = 0$. So, eigenvalues are $\lambda = 2, 8$.

Eigenvalue: 2 Eigenvector: $(1, 1)^T$

Eigenvalue: 8 Eigenvector: $(1, -5)^T$

1.1 Compare to numpy linalg eig

Eigenvalue: 2 Eigenvector: $(-\sqrt{2}, -\sqrt{2})^T$

Eigenvalue: 8 Eigenvector: $(0.196, -0.981)^T$

2 Conclusion

Eigenvalues are exactly same and the eigenvectors are same up to scale factor.