MAT 211: Linear Algebra
Problem Set 11

Stony Brook University   Spring 2019
Dzmitry Dudko

Problem 1. (2+3 points) Show that $\begin{bmatrix} 1 \\ 1 \end{bmatrix}$ and $\begin{bmatrix} 3 \\ 1 \end{bmatrix}$ are eigenvectors of

$$A = \begin{bmatrix} -3 & 6 \\ -2 & 5 \end{bmatrix}.$$

Compute $A^3 \begin{bmatrix} 2 \\ 0 \end{bmatrix} = A^3 \left(\begin{bmatrix} 3 \\ 1 \end{bmatrix} - \begin{bmatrix} 1 \\ 1 \end{bmatrix} \right).$

Problem 2. (5 points)
Suppose that v and w are eigenvectors of a matrix A corresponding to eigenvalues 2 and 3; i.e. $Av = 2v$ and $Aw = 3w$. Prove that v and w are linearly independent.
Hint: consider $c_1 v + c_2 w = 0$ and multiply this equation by A.
Due Date: Thursday May 2.