ENG EC/ME/SE 501:

Exercises (Set 2) (Due 9/27/17)

1. For the following two matrices:

\[
A = \begin{pmatrix}
-2 & 0 & -1 \\
4 & 2 & 4 \\
0 & 0 & -1
\end{pmatrix} \quad B = \frac{1}{8} \begin{pmatrix}
9 & 0 & -3 \\
10 & -8 & 2 \\
3 & 0 & -1
\end{pmatrix}
\]

find (a) the characteristic polynomial; (b) the determinant and trace; (c) the eigenvectors.

2. Find the Jordan Normal Form \( J_A \) of

\[
A = \begin{pmatrix}
5 & 5 & -4 \\
8 & 5 & -4 \\
12 & 6 & -5
\end{pmatrix}
\]

3. For the matrix in Problem 2, find a nonsingular matrix (change of basis) \( U \) such that

\[
U^{-1} \cdot A \cdot U = J_A.
\]