Week 7 Day 3

Nullity and invertibility

Make sure you know your neighbors' names. Then take 2 minutes to discuss:

Is it true that any matrix with nullity 0 must be invertible? If so, can you explain why? If not, can you come up with a specific counterexample?

Characteristic Polynomial

1. $\lambda = 1$ is an eigenvalue of the following matrix A.

$$A = \begin{bmatrix} 1 & 1 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$

Which of the following is true about A?

(A) $\lambda = 1$ is the *only* eigenvalue of A.

(B) The eigenspace corresponding to $\lambda = 1$ is 2-dimensional.

(C) The eigenspace corresponding to $\lambda = 1$ is 3-dimensional.

(D) None of the above OR more than one of the above.

2. $\lambda = 1, 2, 3$ are the eigenvalues of a 4×4 matrix A, and $\lambda = 1, 2$ have multiplicity 1. What is the multiplicity of $\lambda = 3$?

(A) 1

(B) 2

(C) 3

(D) Can't say for sure

3. (A) True or (B) False? Suppose A is a non-invertible square matrix. Then 0 must be the only eigenvalue of A.

4. (A) True or (B) False? IF A is row equivalent to B, then the eigenvalues of A are the same as the eigenvalues of B.