

Quiz 4 for Linear Algebra

Name :

True/False. Answer only

1. Let I be the 10×10 identity matrix and J be the 10×10 matrix of all 1's, and consider

$$A = (a - b)I + bJ; \text{ that is, } A = \begin{pmatrix} a & b & b & \cdots & b \\ b & a & b & \cdots & b \\ b & b & a & \cdots & b \\ \cdots & \cdots & \cdots & \cdots & \cdots \\ b & b & b & \cdots & a \end{pmatrix}.$$

Then, $a - b$ and $a + 10b$ are the eigenvalues of A with (algebraic) multiplicities 9 and 1, respectively.

2. Let u, v, w, z be vectors in R^n and let $A = uv^T + wz^T$. Then $\{v, z\}$ spans $\text{Row}A$.

3. Diagonalize $\begin{pmatrix} 0 & -4 & -6 \\ -1 & 0 & -3 \\ 1 & 2 & 5 \end{pmatrix}$ (Please find P and D only)

4. Suppose a 3×3 matrix A has eigenvalues 0, 3, 5 with independent eigenvectors u , v , w . Find all solutions of $Ax = v + w$.

5. Find bases for Col A , Nul A , Row A of $A = \begin{pmatrix} 2 & 4 & -1 & 5 & -2 \\ -4 & -5 & 3 & -8 & 1 \\ 2 & -5 & -4 & 1 & 8 \\ -6 & 0 & 7 & -3 & 1 \end{pmatrix}$.