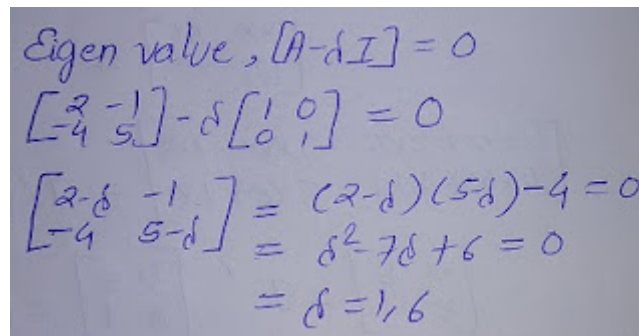


GATE 2005

What are the eigenvalues of the following 2×2 matrix?

$$\begin{bmatrix} 2 & -1 \\ -4 & 5 \end{bmatrix}$$

SOL.



Handwritten solution showing the steps to find the eigenvalues of the matrix $\begin{bmatrix} 2 & -1 \\ -4 & 5 \end{bmatrix}$. The solution starts with the characteristic equation $[A - \lambda I] = 0$, then substitutes the matrix and simplifies to a quadratic equation $\lambda^2 - 7\lambda + 6 = 0$, which is solved to give eigenvalues $\lambda = 1, 6$.

$$\begin{aligned} \text{Eigen value, } [A - \lambda I] &= 0 \\ \begin{bmatrix} 2 & -1 \\ -4 & 5 \end{bmatrix} - \lambda \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} &= 0 \\ \begin{bmatrix} 2-\lambda & -1 \\ -4 & 5-\lambda \end{bmatrix} &= (2-\lambda)(5-\lambda) - 4 = 0 \\ &= \lambda^2 - 7\lambda + 6 = 0 \\ &= \lambda = 1, 6 \end{aligned}$$

Related posts:

2. Normal Forms
3. L-HOSPITAL RULE
4. Static Single Assignment
6. Birthday Attack