

Compute the eigenvalues of matrix  $\mathbf{A} = \begin{bmatrix} 2 & -3 & -1 \\ -5 & 4 & 2 \\ 1 & -5 & -1 \end{bmatrix}$ . [103 台科大機械 3(a)]

$$[\text{解}] |\mathbf{A} - \lambda \mathbf{I}| = 0 \Rightarrow \begin{vmatrix} 2-\lambda & -3 & -1 \\ -5 & 4-\lambda & 2 \\ 1 & -5 & -1-\lambda \end{vmatrix} = 0$$

$$-(\lambda - 2)(\lambda - 4)(\lambda + 1) - 25 - 6 - (\lambda - 4) - 10(\lambda - 2) + 15(\lambda + 1) = 0$$

$$-(\lambda^3 - 5\lambda^2 + 2\lambda + 8) - 31 + 4\lambda + 39 = 0 \Rightarrow \lambda^3 - 5\lambda^2 - 2\lambda = 0 \Rightarrow \lambda = 0, \frac{5 \pm \sqrt{33}}{2}$$

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