

2. The system of eq's

$$\lambda x + y + z = 0, \quad -x + \lambda y + z = 0, \quad -x - y + \lambda z = 0$$

will have a non-zero solution, if real values of λ are given by

Solⁿ

non-zero solution if

$$\begin{vmatrix} \lambda & 1 & 1 \\ -1 & \lambda & 1 \\ -1 & -1 & \lambda \end{vmatrix} = 0$$

$$\Rightarrow \lambda(\lambda^2 + 1) - 1(-\lambda + 1) + 1(1 + \lambda) = 0$$

$$\Rightarrow \lambda^3 + \lambda + \lambda - 1 + 1 + \lambda = 0$$

$$\Rightarrow \lambda^3 + 3\lambda = 0$$

$$\Rightarrow \lambda(\lambda^2 + 3) = 0 \Rightarrow \underline{\lambda = 0}$$