



The number of values of $\theta \in (0, \pi)$ for which the system of linear equations $x + 3y + 7z = 0$; $\sin 3\theta x + \cos 2\theta y + 2z = 0$; $-x + 4y + 7z = 0$, has a non – trivial solution, is :

Solution: $\theta \in (0, \pi)$

$$\begin{vmatrix} 0 & 1 & 0 \\ -1 & 4 & -1 \\ \sin 3\theta & \cos 2\theta & 2 - 2\cos 2\theta \end{vmatrix} = 0$$

$$\Rightarrow -1(2 - 2\cos 2\theta) + \sin 3\theta = 0$$

$$\Rightarrow \sin 3\theta + 2\cos 2\theta = 2$$

$$\Rightarrow \sin 3\theta = 4\sin^2\theta$$

$$\Rightarrow 3\sin\theta - 4\sin^3\theta - 4\sin^2\theta = 0$$

$$\Rightarrow -\sin\theta(4\sin^2\theta + 4\sin\theta - 3) = 0$$

$$\Rightarrow \sin\theta = 0, \frac{1}{2}, -\frac{3}{2}$$

A

Four

B

Three

C

Two

D

One