Let S be the set of all $\lambda \in \mathbb{R}$ for which the system of linear equations $2x - y + 2z = 2$; $x - 2y + \lambda z = -4$; $x + \lambda y + z = 4$, has no solution. Then the set S

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A Contains more than two elements

B Contains exactly two elements

C Is a singleton

D Is an empty set

Solution: S be the set of all $\lambda \in \mathbb{R}$

$$\left.\begin{aligned} 2x - y + 2z &= 2 \\ x - 2y + \lambda z &= -4 \\ x + \lambda y + z &= 4 \end{aligned}\right\} \text{ No solution}$$

$$\Delta = \begin{vmatrix} 2 & -1 & 2 \\ 1 & -2 & \lambda \\ 1 & \lambda & 1 \end{vmatrix} = 0$$

$C_1 \to C_1 - C_3$

$$\Delta = \begin{vmatrix} 0 & -1 & 2 \\ 1-\lambda & -2 & \lambda \\ 0 & \lambda & 1 \end{vmatrix} = 0$$

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

$$\Rightarrow \lambda = 1, -\frac{1}{2}$$

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