

Step-1

(a)

If,

$$\begin{aligned}x_1 &= x_2 \\&= x_3 \\&= x_4 \\&= 0\end{aligned}$$

Then S is spanned by $(0, 0, 0, 0)$.

The dimension of $\boxed{S = 0}$.

Step-2

(b)

If $x_1 \neq 0$ and

$$\begin{aligned}x_2 &= x_3 \\&= x_4 \\&= 0\end{aligned}$$

Then S is spanned by $(x_1, 0, 0, 0) = \{(x_1, 0, 0, 0) / x_1 \in R\}$

The dimension of $\boxed{S = 1}$.

Step-3

(c)

If,

$$\begin{aligned}v_1 &= (1, 0, 0, 0) \\v_2 &= (0, 1, 0, 0) \\v_3 &= (0, 0, 1, 0)\end{aligned}$$

v_1, v_2, v_3 Are linearly independent

S is spanned by v_1, v_2, v_3 then dimension of $\boxed{S = 3}$.

Step-4

(d)

$$v_1 = (1, 0, 0, 0)$$

$$v_2 = (0, 1, 0, 0)$$

$$v_3 = (0, 0, 1, 0)$$

$$v_4 = (0, 0, 0, 1),$$

If S is spanned by $\{v_1, v_2, v_3, v_4\}$ then dimension of $\boxed{S = 4}$.