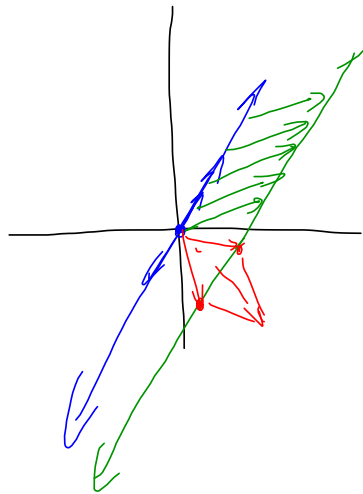


$$\vec{x} = s \begin{bmatrix} 3 \\ 1 \end{bmatrix} + t \begin{bmatrix} 1 \\ 2 \end{bmatrix}$$

$$\begin{bmatrix} 3 \\ 6 \end{bmatrix} \quad \begin{bmatrix} -5 \\ -10 \end{bmatrix}$$



$$2 \begin{bmatrix} 1 \\ -1 \\ 2 \end{bmatrix} + 1 \begin{bmatrix} 1 \\ 3 \\ 1 \end{bmatrix} = 1 \begin{bmatrix} 3 \\ 1 \\ 5 \end{bmatrix}$$

$$2 \begin{bmatrix} 1 \\ -1 \\ 2 \end{bmatrix} + 1 \begin{bmatrix} 1 \\ 3 \\ 1 \end{bmatrix} - 1 \begin{bmatrix} 3 \\ 1 \\ 5 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$$

↑ ↑ ↑
Vectors are dependent

Is S an independent set?

$$c_1 \begin{bmatrix} 1 \\ -1 \\ 2 \end{bmatrix} + c_2 \begin{bmatrix} 1 \\ 3 \\ 1 \end{bmatrix} + c_3 \begin{bmatrix} 2 \\ -2 \\ 1 \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \end{bmatrix}$$

$$\begin{array}{l} c_1 + c_2 + 2c_3 = 0 \\ -c_1 + 3c_2 - 2c_3 = 0 \\ 2c_1 + c_2 + c_3 = 0 \end{array} \Rightarrow \left[\begin{array}{ccc|c} 1 & 1 & 2 & 0 \\ -1 & 3 & -2 & 0 \\ 2 & 1 & 1 & 0 \end{array} \right] \xrightarrow{\text{rref}} \left[\begin{array}{ccc|c} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \end{array} \right]$$

Yes, S is an independent set.