

# ASSIGNMENT-2

AI24BTECH11016-Jakkula Adishesh Balaji

## VECTOR ARITHMETIC(RANK)

Question(1.6.4) Show that the vectors  $2\hat{i} - 3\hat{j} + 4\hat{k}$  and  $-4\hat{i} + 6\hat{j} - 8\hat{k}$  are collinear.

**Solution:** We have the vectors

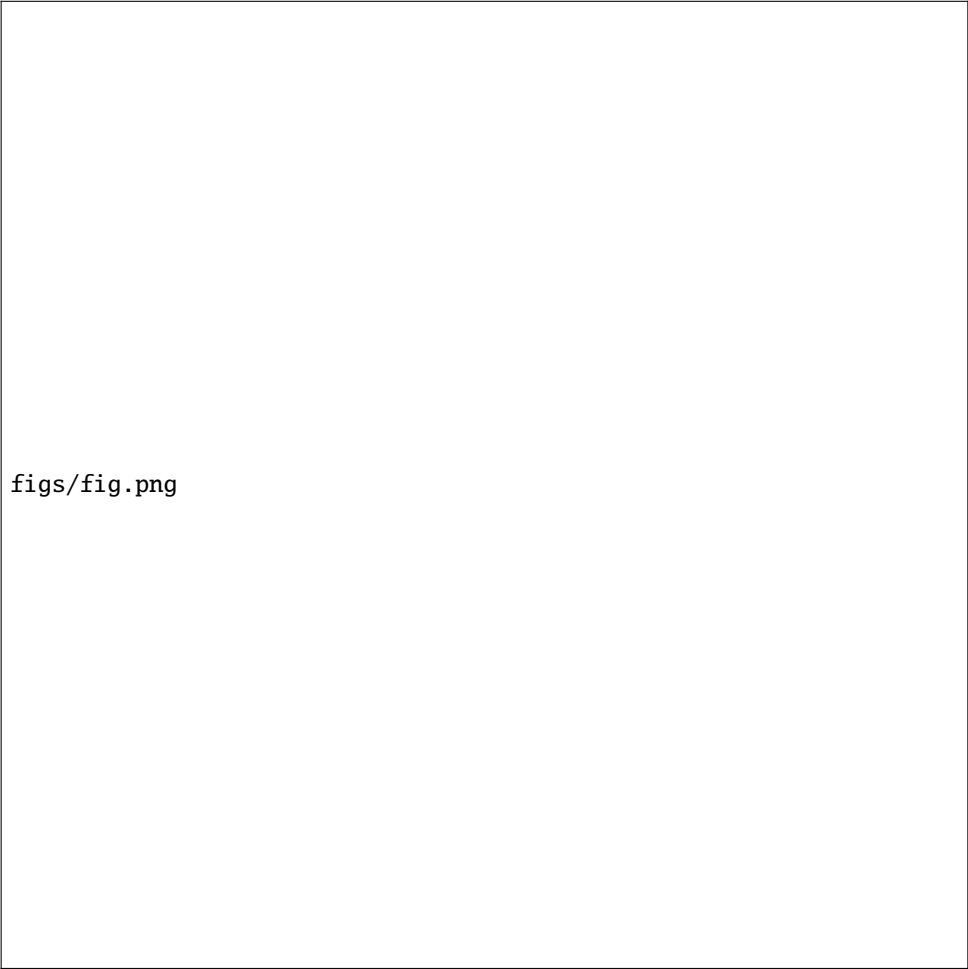
Point	Vector
Matrix A	$\begin{pmatrix} 2 \\ -3 \\ 4 \end{pmatrix}$
Matrix B	$\begin{pmatrix} -4 \\ 6 \\ -8 \end{pmatrix}$

The matrix

$$\begin{pmatrix} A & B \end{pmatrix}^T = \begin{pmatrix} 2 & -3 & 4 \\ -4 & 6 & -8 \end{pmatrix}$$

$$\xleftrightarrow{R_2 = R_2 + 2R_1} \begin{pmatrix} 2 & -3 & 4 \\ 0 & 0 & 0 \end{pmatrix}$$

which has rank 1. Hence, we conclude the given vectors are collinear



figs/fig.png

Fig. 0.1: Plot of **A,B**