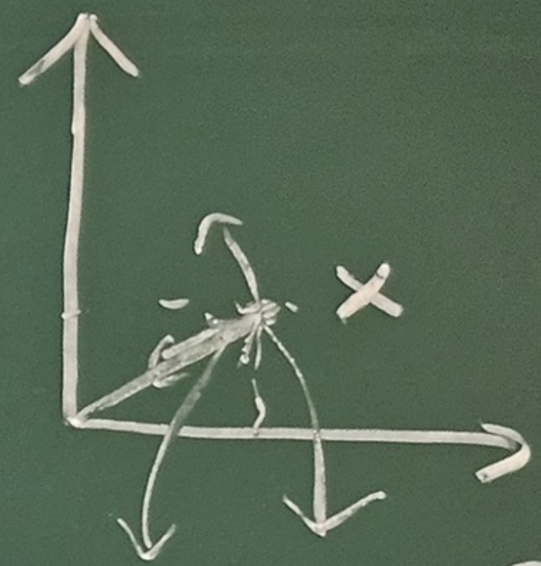
$$A = \begin{bmatrix} -\frac{1}{2} & \frac{1}{2} \\ 3 & -1 \end{bmatrix}$$



$Ax = \lambda x \quad , \lambda \in \mathbb{R} \quad x \in \mathbb{R}^2$

$Av = \lambda v$

$IAv - I\lambda v = O_2 \quad / \cdot I$

$(IA - I\lambda)v = O$

$(A - \lambda I)v = O$

$\det(A - \lambda I) = 0$

dlaczegologia.pl

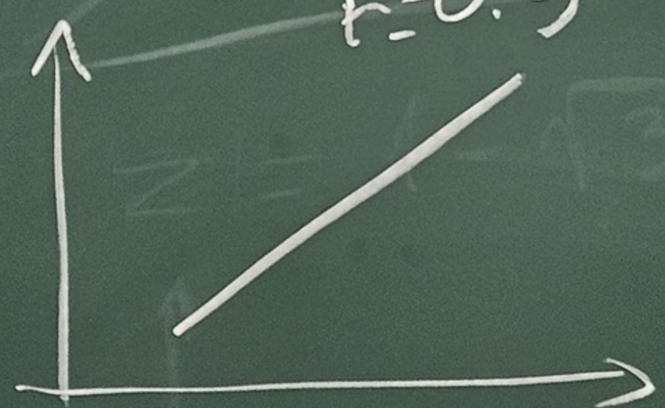
$$\det\begin{bmatrix} -\frac{1}{2}-\lambda & \frac{1}{2} \\ 3 & -1-\lambda \end{bmatrix} = 0$$

$$\left(\lambda+\frac{1}{2}\right)(\lambda+1) - \frac{3}{2} = 0$$

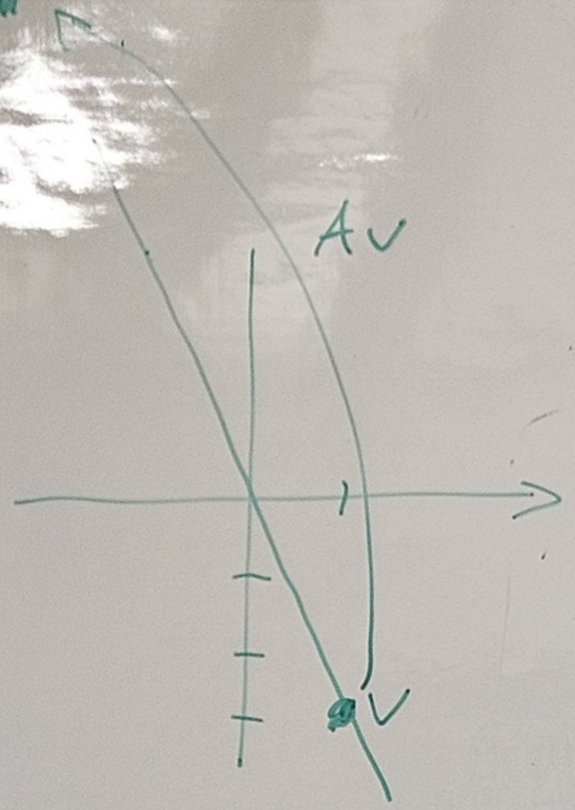
$$(\lambda-\tfrac{1}{2})(\lambda+2)$$

$\lambda_1 = -2$

$\lambda_2 = -\frac{1}{2}$







$$A - \lambda_1 I = \begin{bmatrix} \frac{3}{2} & \frac{1}{2} \\ 3 & 1 \end{bmatrix}$$

$\lambda_1 = 2$

$$\begin{bmatrix} v^{(1)} \\ v^{(2)} \end{bmatrix}$$

$$\begin{bmatrix} \frac{3}{2} & \frac{1}{2} \\ 3 & 1 \end{bmatrix} \begin{bmatrix} \frac{3}{2}v^{(1)} + \frac{1}{2}v^{(2)} \\ 3v^{(1)} + v^{(2)} \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$$

$$v^{(2)} = -3v^{(1)}$$

$$\begin{bmatrix} v^{(1)} \\ -3v^{(1)} \end{bmatrix} = v^{(1)} \begin{bmatrix} 1 \\ -3 \end{bmatrix}$$

$$A v_1 = \lambda_1 v_1$$

$$A v_2 = \lambda_2 v_2$$

$$\begin{bmatrix} A v_1 & A v_2 \end{bmatrix} = \begin{bmatrix} \lambda_1 v_1 & \lambda_2 v_2 \end{bmatrix}$$

$$A \begin{bmatrix} v_1 & v_2 \end{bmatrix} = \begin{bmatrix} v_1 & v_2 \end{bmatrix} \begin{bmatrix} \lambda_1 & 0 \\ 0 & \lambda_2 \end{bmatrix}$$

$$AP = P\Lambda$$

$$A = P\Lambda P^{-1}$$