

$$\det \left(\begin{bmatrix} 1 & 3 \\ 3 & 1 \end{bmatrix} - \lambda \cdot \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \right) = 0$$

$$\det \left(\begin{bmatrix} 1 & 3 \\ 3 & 1 \end{bmatrix} - \begin{bmatrix} \lambda & 0 \\ 0 & \lambda \end{bmatrix} \right) = 0$$

$$\det \left(\begin{bmatrix} 1-\lambda & 3 \\ 3 & 1-\lambda \end{bmatrix} \right) = 0$$

$$(1-\lambda)(1-\lambda) - 3 \cdot 3 = 0$$

$$1 - 2\lambda + \lambda^2 - 9 = 0$$

$$\lambda^2 - 2\lambda - 8 = 0$$

$$\lambda_{1,2} = \frac{+2 \pm \sqrt{4 + 32}}{2} = \frac{2 \pm 6}{2} = \begin{matrix} 4 \\ -2 \end{matrix}$$

$$\lambda = 4 \Rightarrow \begin{bmatrix} -3 & 3 \\ 3 & -3 \end{bmatrix}$$

$$\lambda = -2 \Rightarrow \begin{bmatrix} 3 & 3 \\ 3 & 3 \end{bmatrix}$$

$$\lambda = -2 \Rightarrow \begin{bmatrix} 3 & 3 \end{bmatrix}$$

$$\det \begin{pmatrix} 1-\lambda & 6 \\ 5 & 2-\lambda \end{pmatrix} = 0$$

$$(1-\lambda)(2-\lambda) - 30 = 0$$

$$2 - 3\lambda + \lambda^2 - 30 = 0$$

$$\lambda^2 - 3\lambda - 28 = 0$$

$$\lambda_{1,2} = \frac{3 \pm \sqrt{9 + 112}}{2} = \frac{3 \pm 11}{2} = \begin{matrix} 7 \\ -4 \end{matrix}$$

AUTOVETTORI

$$\begin{bmatrix} 1 & 3 \\ 3 & 1 \end{bmatrix}$$

$$\lambda_1 = 4$$

$$\lambda_2 = -2$$

$$\lambda_1 = 4$$

$$\begin{bmatrix} 1-4 & 3 \\ 3 & 1-4 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$$

$$\begin{cases} -3x + 3y = 0 \\ \cancel{3x - 3y = 0} \end{cases}$$

$$\begin{cases} x = y \\ " \end{cases}$$

$$\begin{bmatrix} y \\ y \end{bmatrix}$$

$$\rightarrow y \cdot \begin{bmatrix} 1 \\ 1 \end{bmatrix}$$

AUTOVEITTORE ASSOCIATO A
 $\lambda = 4$

$$\lambda_2 = -2$$

$$\begin{bmatrix} 3 & 3 \\ 3 & 3 \end{bmatrix} \cdot \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$$

$$\begin{cases} 3x + 3y = 0 \\ \cancel{3x + 3y = 0} \end{cases}$$

$$\begin{cases} x = -y \\ " \end{cases}$$

$$\begin{bmatrix} -y \\ y \end{bmatrix}$$

$$\rightarrow y \begin{bmatrix} -1 \\ 1 \end{bmatrix}$$

AUTOVEITTORE ASSOCIATO A
 $\lambda = -2$

$$\begin{bmatrix} 1 & 6 \\ 5 & 2 \end{bmatrix}$$

$$\lambda_1 = 7$$

$$\lambda_2 = -4$$

$$\lambda_1 = 7 \quad \begin{bmatrix} 1-7 & 6 \\ 5 & 2-7 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$$

$$\begin{cases} -6x + 6y = 0 \\ \cancel{5x - 5y = 0} \end{cases} \quad \begin{cases} x = y \\ \hookrightarrow \end{cases}$$

$$\begin{bmatrix} y \\ y \end{bmatrix} \rightarrow y \begin{bmatrix} 1 \\ 1 \end{bmatrix}$$

$$\lambda_2 = -4 \quad \begin{bmatrix} 5 & 6 \\ 5 & 6 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$$

$$\begin{cases} 5x + 6y = 0 \\ \cancel{5x + 6y = 0} \end{cases} \quad \begin{cases} x = -\frac{6}{5}y \\ \hookrightarrow \end{cases}$$

$$\begin{bmatrix} -\frac{6}{5}y \\ y \end{bmatrix} \rightarrow y \begin{bmatrix} -\frac{6}{5} \\ 1 \end{bmatrix}$$