

$$\begin{pmatrix} 1 & 1 \\ 1 & 3 \end{pmatrix} \quad \left(\begin{array}{c|c} \boxed{0} & \boxed{1} \\ \hline \boxed{1} & \boxed{0} \end{array} \right) \rightarrow \vec{v}_P: (1,1) \quad v_P = 2 \\ \vec{v}_P: (1,-1) \quad v_P = -1$$

$$\boxed{\begin{matrix} \lambda_1 + \lambda_2 = 4 \\ \lambda_1 \cdot \lambda_2 = 2 \end{matrix}} \quad \left(\begin{pmatrix} 1 & 1 \\ 1 & -1 \end{pmatrix}^{-1} \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix} \begin{pmatrix} 1 & 1 \\ 1 & -1 \end{pmatrix} \right)$$

$$\begin{pmatrix} a & b \\ c & d \end{pmatrix} \rightarrow \text{tr} = a+d = \lambda_1 + \lambda_2$$

$$\det = ad-bc = \lambda_1 \cdot \lambda_2 \quad \text{nicht diagonalisierbar}$$

$$\text{tr } AB = \text{tr } BA$$

$$A = P^{-1} D P$$

$$\text{tr } A = \text{tr } (P^{-1} D P) = \underbrace{\text{tr } D P P^{-1}}_{= \text{tr } D}$$

$$\chi = \det(M - x \text{Id}) = \det \begin{pmatrix} 1-x & 1 \\ 1 & 3-x \end{pmatrix}$$

$$= (1-x)(3-x) - 1$$

$$= 3 - 4x + x^2 - 1$$

$$= x^2 - 4x + 2$$

$$= (x-2)^2 - 2$$

$$\chi = 0 \Leftrightarrow (x-2)^2 - 2 = 0 \Leftrightarrow \underline{x = 2 \pm \sqrt{2}} \quad \text{da } \mathbb{R} \nsubseteq \mathbb{F}_5$$

$$\underline{(x, y)} \begin{pmatrix} 1 & 1 \\ 1 & 3 \end{pmatrix} = \underline{(2+\sqrt{2})} \underline{(x, y)} \quad \mu M = \underline{2} \mu$$

$$x+y = (2+\sqrt{2})x \quad x=1, y=1+\sqrt{2} \quad \underline{(1, 1+\sqrt{2})}$$

$$(x, y) \begin{pmatrix} 1 & 1 \\ 1 & 3 \end{pmatrix} = (2-\sqrt{2})(x, y) \quad x=1, y=\underline{1-\sqrt{2}}$$

$$P^{-1} \begin{pmatrix} 2+\sqrt{2} & 0 \\ 0 & 2-\sqrt{2} \end{pmatrix} \underbrace{\begin{pmatrix} 1 & 1+\sqrt{2} \\ 1 & 1-\sqrt{2} \end{pmatrix}}_P$$