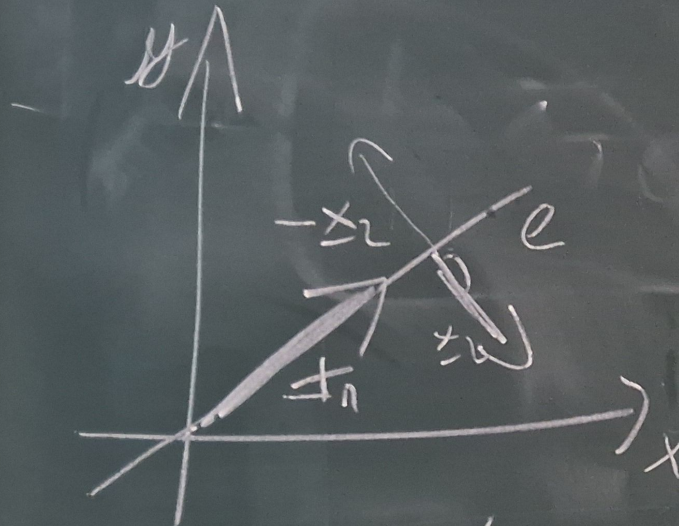
$$E_4 = \begin{pmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & 0 & 1 \end{pmatrix}$$

$$\operatorname{trace}(E_4) = 4$$

$$\operatorname{tr} \begin{pmatrix} 0 & -a_{21} & -a_{31} & \\ a_{21} & 0 & -a_{32} & \\ a_{31} & a_{32} & 0 & \\ & & & \ddots \end{pmatrix} = 0$$

8.22 e.vá & e.vé of linear transformations

(1) a) Mirroring the vectors of a plan to a line



$\underline{M}$: mirroring vectors on „e" line

$$\underline{M} \cdot \underline{x} = \lambda \cdot \underline{x}$$

$\underline{x}_1, \lambda = 1$: $\underline{x} \parallel$ „e" line

$\underline{x}_2, \lambda = -1$: $\underline{x} \perp$ „e" line

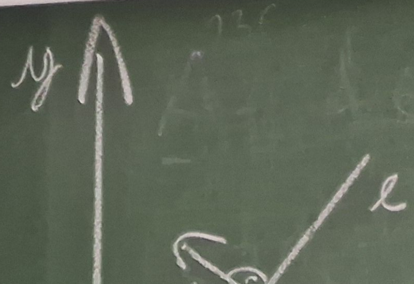
b) Projection of the vectors of a plan to „e" line

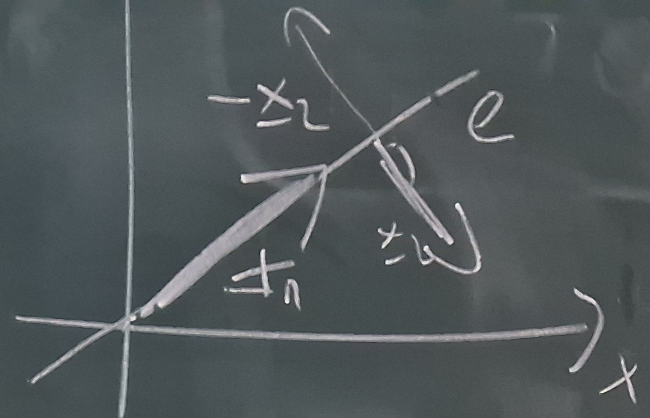
$\underline{P}$: projection of $\underline{x}$ to „e" line

$$\underline{P} \underline{x} = \lambda \underline{x}$$

$\underline{x}_1, \lambda = 1$: $\underline{x} \parallel$ „e" line

… „e" line





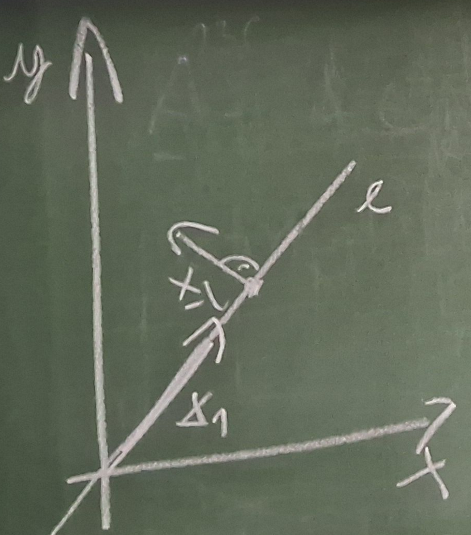
vectors on „e" line

$$\underline{M} \cdot \underline{x} = \lambda \cdot \underline{x}$$

$\underline{x}_1,\ \lambda = 1 : \underline{x} \parallel$ „e" line

$\underline{x}_2,\ \lambda = -1 : \underline{x} \perp$ „e" line

b) Projection of the vectors of a plan to „e" line



$\underline{P}$: projection of $\underline{x}$ to „e" line

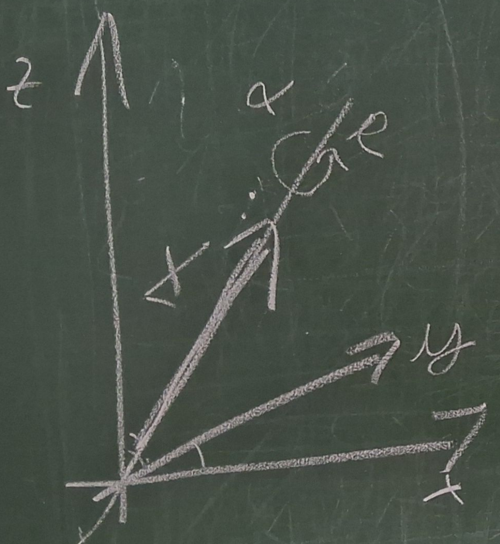
$$\underline{P}\,\underline{x} = \lambda\,\underline{x}$$

$\underline{x}_1,\ \lambda = 1 : \underline{x} \parallel$ „e" line

$\underline{x}_2,\ \lambda = 0 : \underline{x} \perp$ „e" line

...sonoak. Ezen felül tudjuk azt is, hogy fontos mátrixtulajdonságok invariánsak a hasonlóságra. E paragrafusban e tulajdonságok körét fogjuk bővíteni.

c) Rotation of the vectors of the space by "α" angle



$\underline{R}$: rotation around "e" line by "α" angle

$\underline{R}\,\underline{x} = \lambda \underline{x}$

$\underline{x}_1, \lambda = 1: \underline{x} \parallel$ "e" line

d) Reflection of 3D vectors to a plane

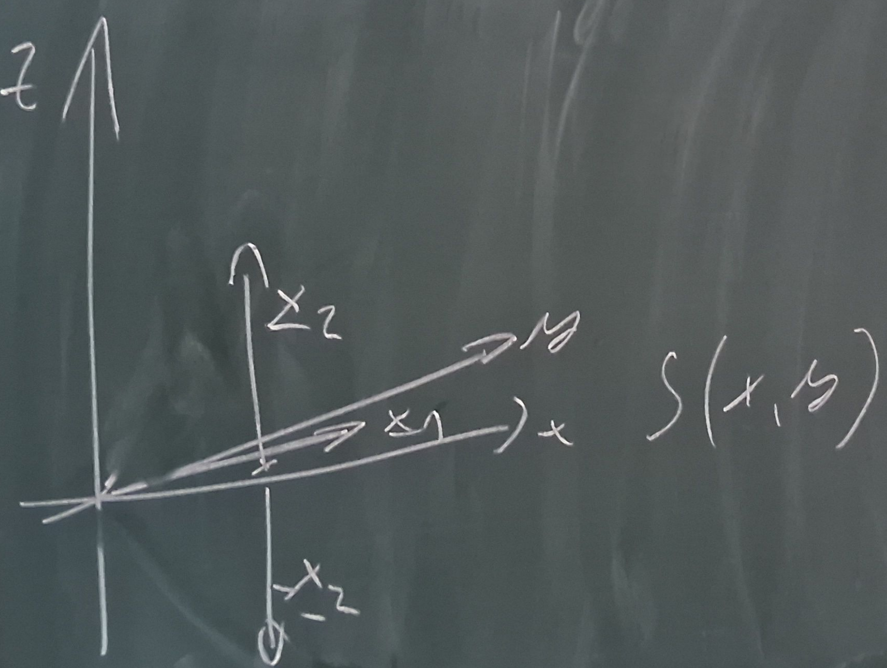
$S(A, b)$

$\underline{P}$: Mirroring x to "S" plane

$\underline{x}_1, \lambda = 1, \underline{x} \in S$

$\underline{x}_2, \lambda = 0, \underline{x} \perp S$

e) Mirroring of 3D vectors to S plane



$\underline{M}\,\underline{x} = \lambda \underline{x}$

$\underline{x}_1, \lambda = 1 : \underline{x} \in S$

$\underline{x}_2, \lambda = -1 : \underline{x} \perp S$