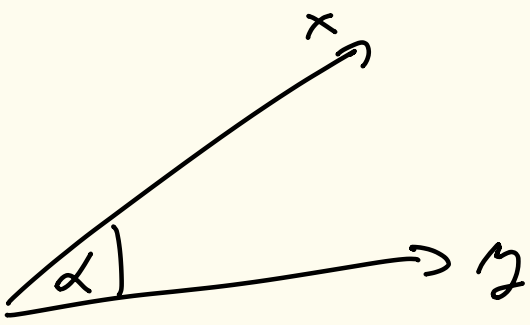


ort. doplněk
prostory jsou ortogonální

$A, B \quad A \perp B$

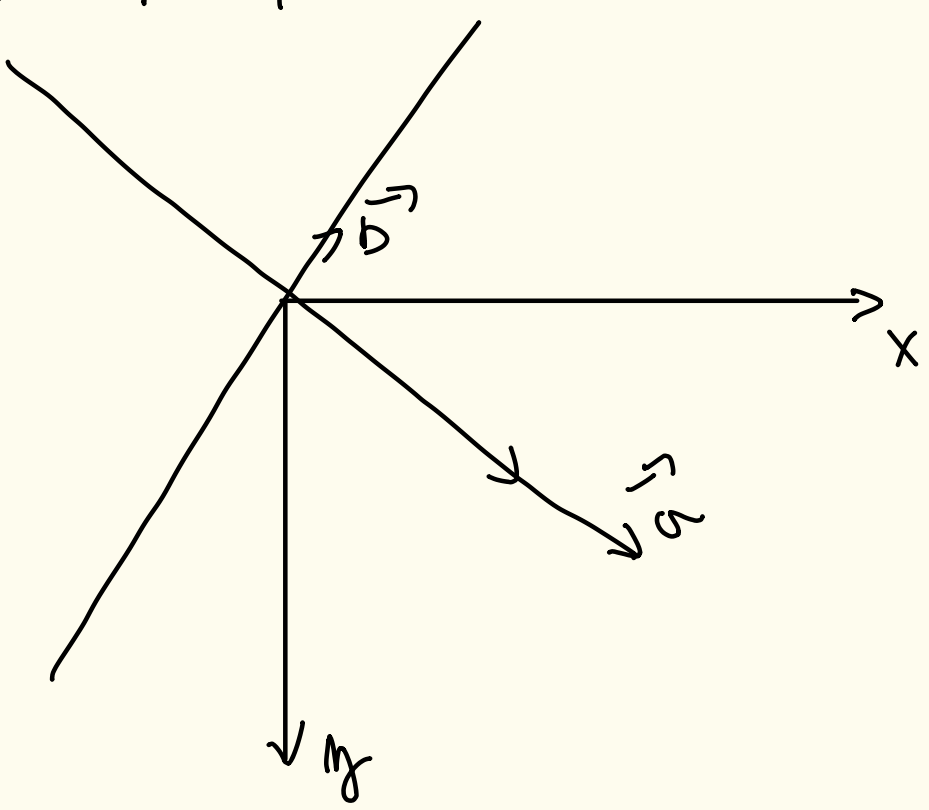
$\Rightarrow a \in A, b \in B \quad a \cdot b = 0$

$A, A^{\perp}$

$a, b \in \mathbb{R}^3$

$A = \text{span}\{a\}$

$B = \text{span}\{B\}$



dim

1 $X = \text{span}\{(1,0,1,0)\}$

3 $Y = \{(x_1, x_2, x_3, x_4) : x_1 + x_3 = 0\}$

2 $Z = \{(x_1, x_2, x_3, x_4) : x_1 + x_3 = 0, x_2 = x_4\}$

? X lin podprostor $\mathbb{R}^4$? √

? musí: $\exists A : Ax = 0 \iff$ {+ je lin podprostor}

$$\begin{bmatrix} 1 & 0 & 1 & 0 \end{bmatrix} \begin{pmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{pmatrix} \quad \checkmark$$

$$\begin{bmatrix} 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & -1 \end{bmatrix} x = \begin{bmatrix} 0 \\ 0 \end{bmatrix}$$

Z? sdílná A jako $m(y)$ ✓

1 $X \perp Y$ ✓

2 $X \perp Z$ ✓

3 $Y \perp Z$ x

4 $X = Y^\perp$ ✓

5 $Y = X^\perp$ ✓

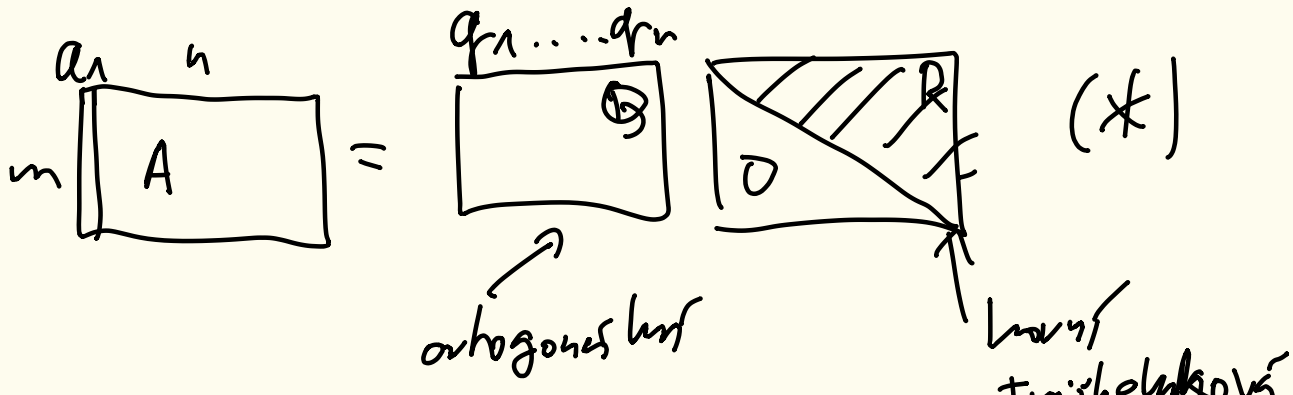
6 $X = Z^\perp$ $Z \subseteq Y$

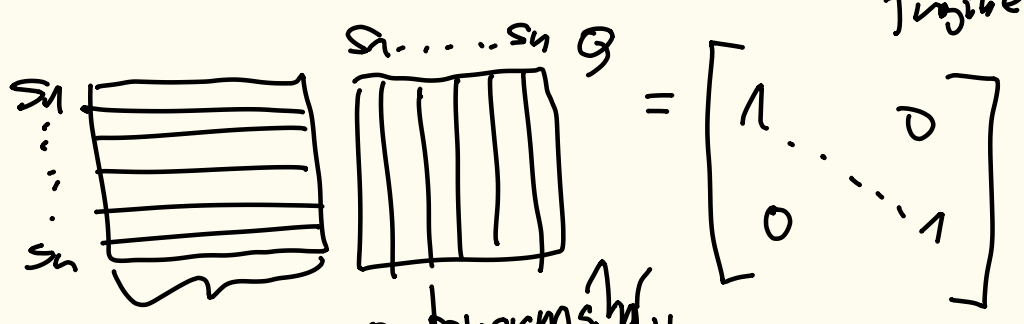
$\dim 1$ $\dim 4$ $2=2$

4) $\dim X = \dim Y = 4$?

$\dim A + \dim A^\perp = n \quad x \in \mathbb{R}^n$

$$\begin{bmatrix} 1 & 1 & 1 & -1 \\ 2 & -1 & -1 & 1 \\ -1 & 2 & 2 & 1 \end{bmatrix}$$





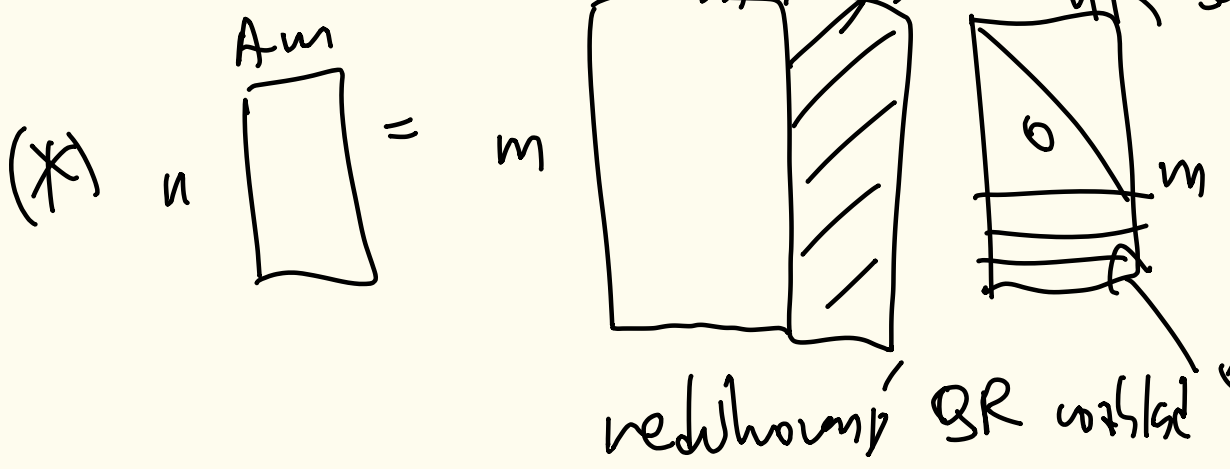
1. sloupec v A:

$a_1 = q_1 \cdot r_{11}$

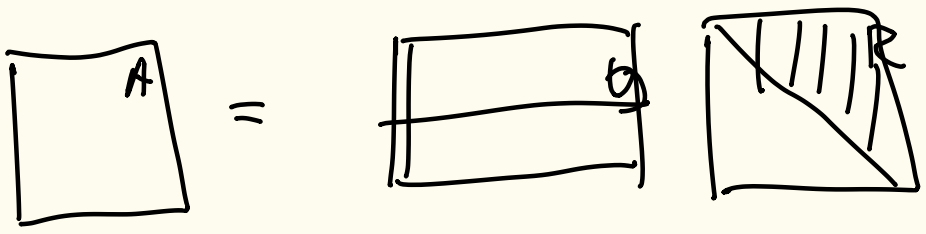
$a_2 = q_1 \cdot r_{12} + q_2 \cdot r_{22}$

$s_i \cdot s_j \quad i \neq j$

$s_i \cdot s_i \quad \forall i$



qr(A, 0)



$$\det A = \det Q \cdot \det R$$

$$\det Q = \prod_{i=1}^{n} r_{ij}$$

1/-1

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

$$\begin{bmatrix} \cos\varphi & -\sin\varphi \\ \sin\varphi & \cos\varphi \end{bmatrix}$$