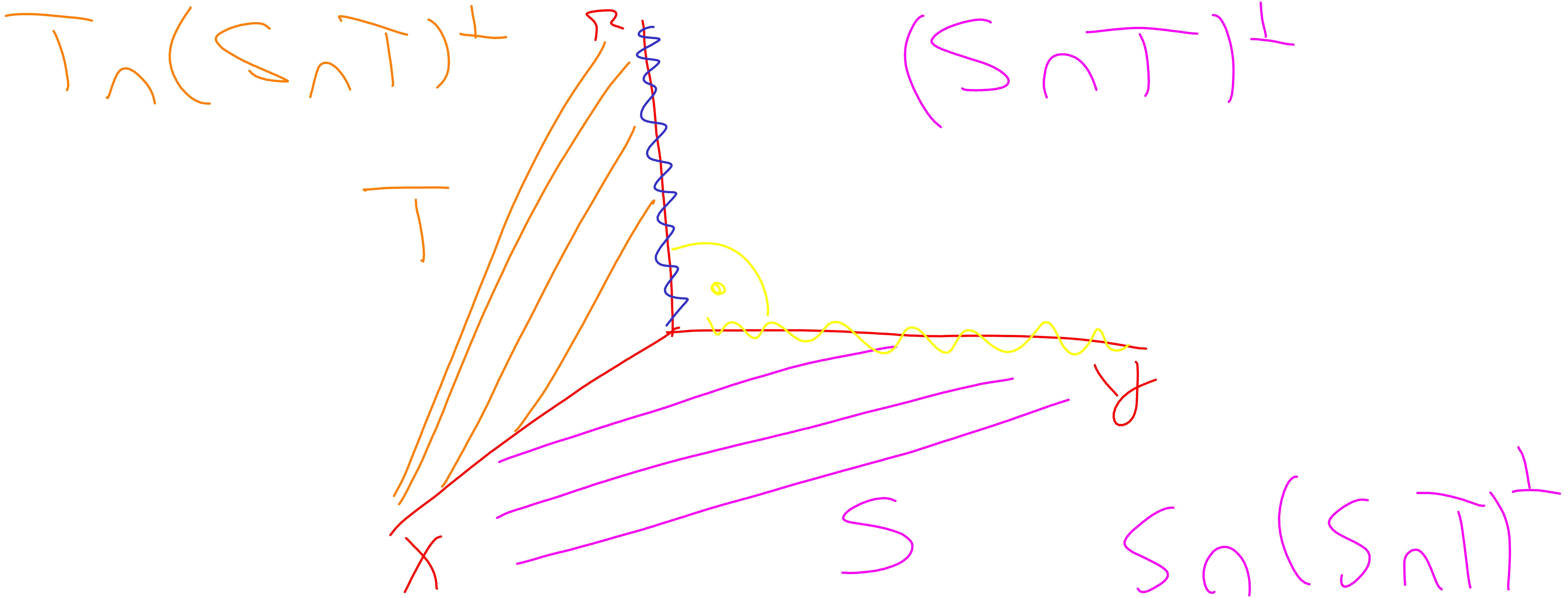


$T \cap (S \cap T)^\perp$
$(S \cap T)^\perp$
z
T
θ
y
x
S
$S \cap (S \cap T)^\perp$

$$\measuredangle(S,T) = \measuredangle\left(S \cap (S\cap T)^{\perp},\ T\cap (S\cap T)^{\perp}\right)$$

$$= \inf\left\{ \measuredangle(x,y) \;\middle|\; x \in S\cap(S\cap T)^{\perp},\ y \in T\cap(S\cap T)^{\perp} \right\}$$

$$= \inf\left\{ \overbrace{\inf\left((x,y) \mid y \in T\cap(S\cap T)^{\perp}\right)}^{\measuredangle(x,T)\ =} \;\middle|\; x \in S\cap(S\cap T)^{\perp} \right\}$$

$\cancel{x} \in S \cap (S \cap T)^{\perp}$

$\inf\{ \measuredangle(x, y) \mid y \in T \cap (S \cap T)^{\perp} \} =$

$= \measuredangle(x, T) = \inf\{ \measuredangle(x, y) \mid y \in T \}$

$\geq$ zúžení z inkluze $\quad T \cap (S \cap T)^{\perp} \subseteq T$

$y \in T \qquad T \ni y = \underset{\cap T}{y_{S \cap T}} + \underset{\subseteq T}{y_{(S \cap T)^{\perp}}}$

$\measuredangle([a]^\perp, S)$ $\boxed{\underline{\underline{\measuredangle(S, [a]^\perp)}}}$

$S \not\subseteq [a]^\perp$ Υπόθ. $\underline{\underline{S \cap [a]^\perp \neq \{0\}}}$

$[a]^\perp \not\subseteq S$

$$S \cap [a]^\perp = \{0\} \Rightarrow \begin{matrix} x \in S \\ x \perp a \end{matrix} \Rightarrow x = 0$$

$$\measuredangle(M, N) = \measuredangle([a]^{\perp}, [b]^{\perp}) =$$

$$= \frac{\pi}{2} - \measuredangle([a], [b]^{\perp}) =$$

$$= \frac{\pi}{2} - \left(\frac{\pi}{2} - \measuredangle([a], [b])\right) = \measuredangle([a], [b])$$

$\mathbf{x}$ je řešení $\iff$ $A\mathbf{x} = \mathbf{b}_S$

$$\mathbf{b} = \mathbf{b}_S + \mathbf{b}_{S^\perp}$$

$$S = [\mathbf{s}_1(A), \ldots, \mathbf{s}_m(A)] \subseteq \mathbb{R}^m$$

$$\mathbf{b}_S = \sum_{j=1}^{m} c_j \mathbf{s}_j(A)$$

$$\underline{G(A) = A^T \cdot A}$$

$$G(A)\begin{pmatrix} c_1 \\ \vdots \\ c_n \end{pmatrix} = A^T \mathbb{b}$$

$$G(A)\begin{pmatrix} c_1 \\ \vdots \\ c_n \end{pmatrix} = \begin{pmatrix} \langle s_1(A), \mathbb{b} \rangle \\ \vdots \\ \langle s_n(A), \mathbb{b} \rangle \end{pmatrix}$$

$$\measuredangle(S,T) = \inf\{\underline{\measuredangle(x,T)},\ 0 \neq x \in S \cap (S \cap T)^\perp\}$$

$$x \in S \cap ([a]^\perp \cap S)^\perp \qquad [a]^\perp \cap S \subseteq [a]^\perp$$

$$x = x_{[a]}^{\in [a]} + x_{[a]^\perp} \qquad \underline{[a] \subseteq ([a]^\perp \cap S)^\perp}$$

$$x \in ([a]^\perp \cap S)^\perp \qquad x - x_{[a]} \in ([a]^\perp \cap S)^\perp$$

analogicky jako v důkazu 3.1

$$\frac{\pi}{2} = \sphericalangle([a\rangle^{+}, S) + \sphericalangle([a\rangle, S)$$

NEPLATÍ OBECNĚ $\sphericalangle(S, T) + \sphericalangle(S^{+}, T) = \frac{\pi}{2}$!

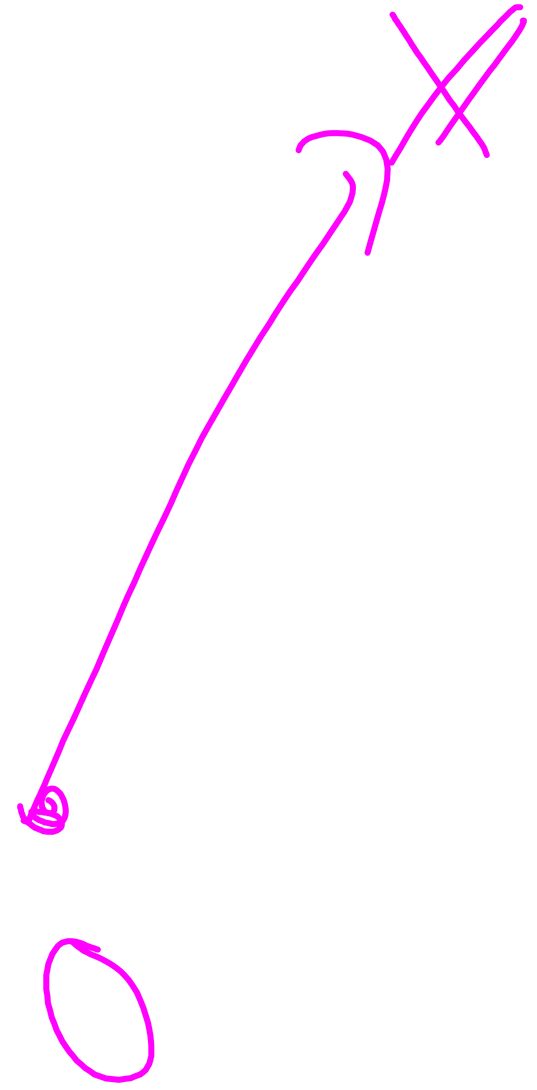
x is minimum $\quad Ax = b$

$\Leftrightarrow x = A^T z$

Rue $A^T A z = b$

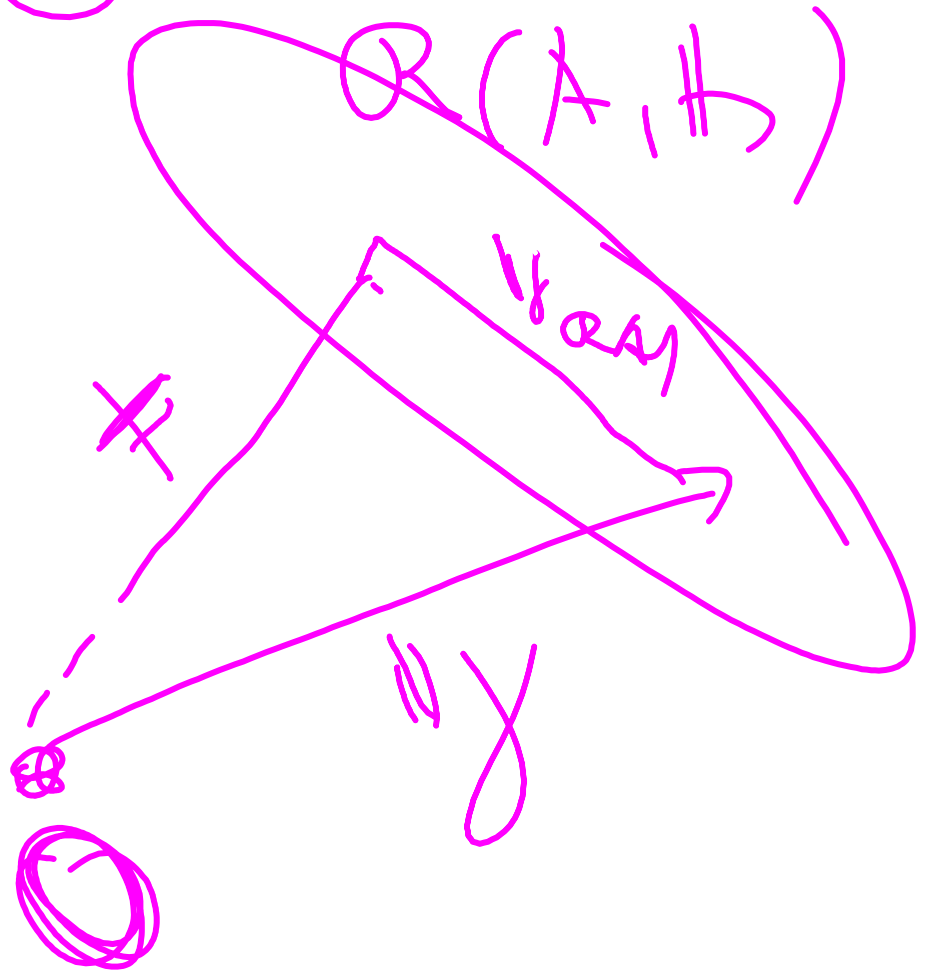
$R(A) = \{u \mid Au = 0\}$

$R(A|b) = \{v \mid Av = b\} \ni x$



$$\dim\left(\{0\},\ \mathcal{R}(A\mid b)\right) = \|x\|$$

$$y \in \mathcal{R}(A\mid b) = y + \mathcal{R}(A)$$



$$x \in \mathcal{R}(A)^\perp$$

$$y = \underset{y_{\mathcal{R}(A)^\perp}}{\underset{\shortparallel}{x}} + \underset{\in \mathcal{R}(A)}{(y - x)}$$

$$x \in R(A)^{\perp} \subseteq \mathbb{R}^{n} \implies x = A^{T} r$$

$$R(A) = \{ u \mid Au = 0 \}$$

$$r_i(A) \cdot u = 0 \quad \forall i$$

$$R(A)^{\perp} = [r_1(A), \dots, r_m(A)]$$

$$= [c_1(A^{T}), \dots, c_m(A^{T})]$$

$$\langle x, \underset{\in T}{y} \rangle = \underset{=0}{\langle x, y_{S\cap T} \rangle} + \underline{\underline{\langle x, y_{(S\cap T)^{\perp}} \rangle}}$$

$$x \in S \cap (S \cap T)^{\perp}$$

$$y_{(S\cap T)^{\perp}} \in T \cap (S \cap T)^{\perp}$$