12.2 Polohové úlohy v stredovom premietaní

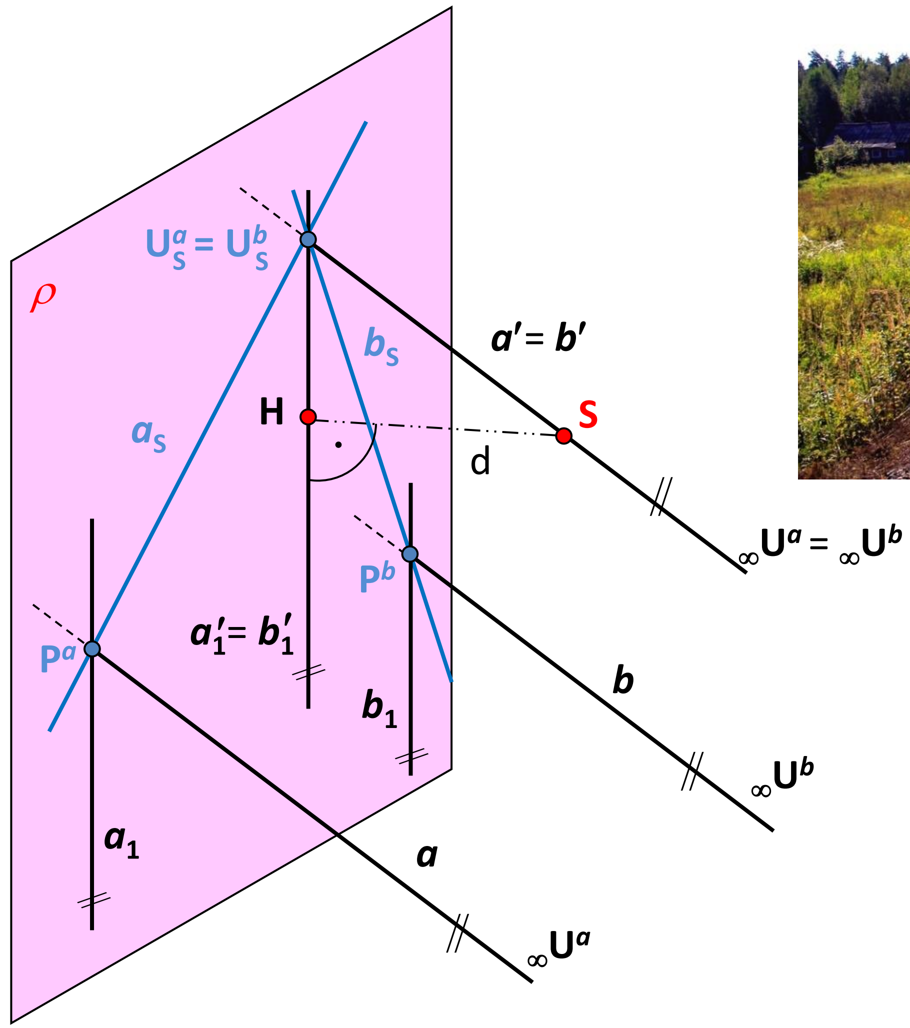
Vzájomná poloha dvoch priamok v stredovom premietaní

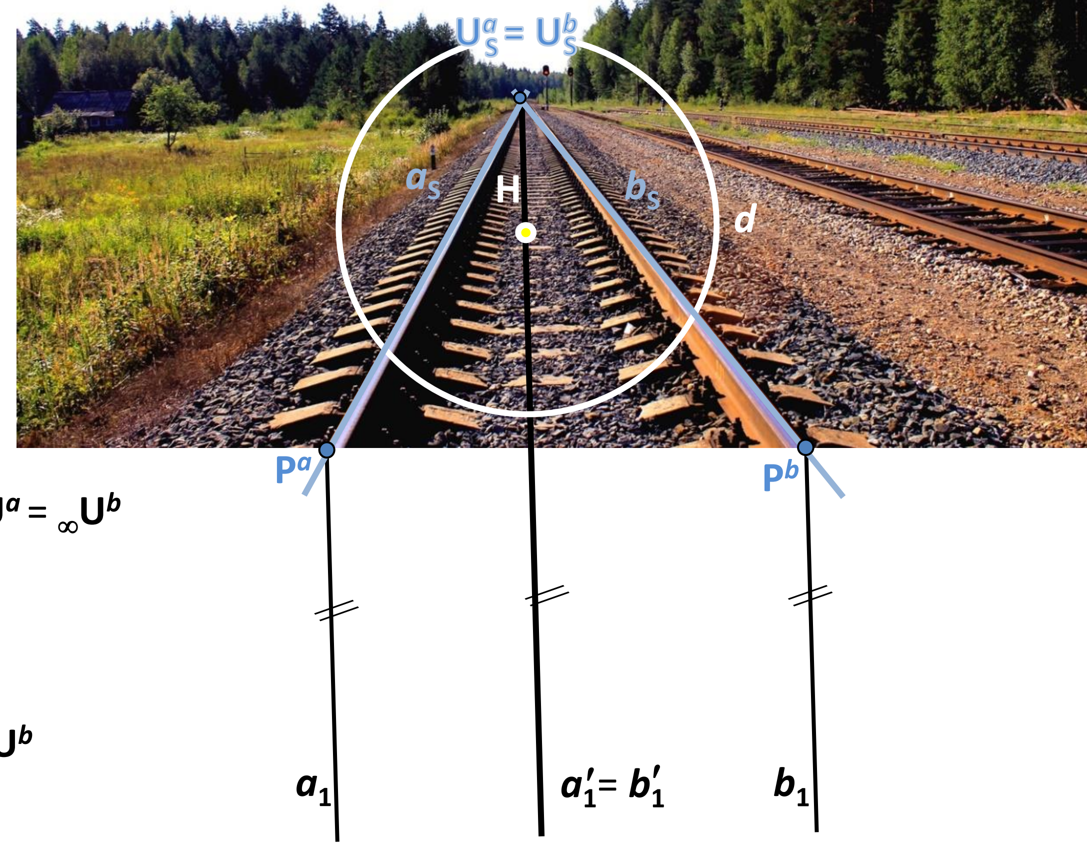
https://www.danielarau.sk/36cielov/kolajnice/

1. Rovnobežné priamky *a, b* – *a* ∥ *b*, potom platí: $\mathbf{U}^a_S = \mathbf{U}^b_S$.

Pre ich smerové priamky platí: $\boldsymbol{a'} = \boldsymbol{b'}$.

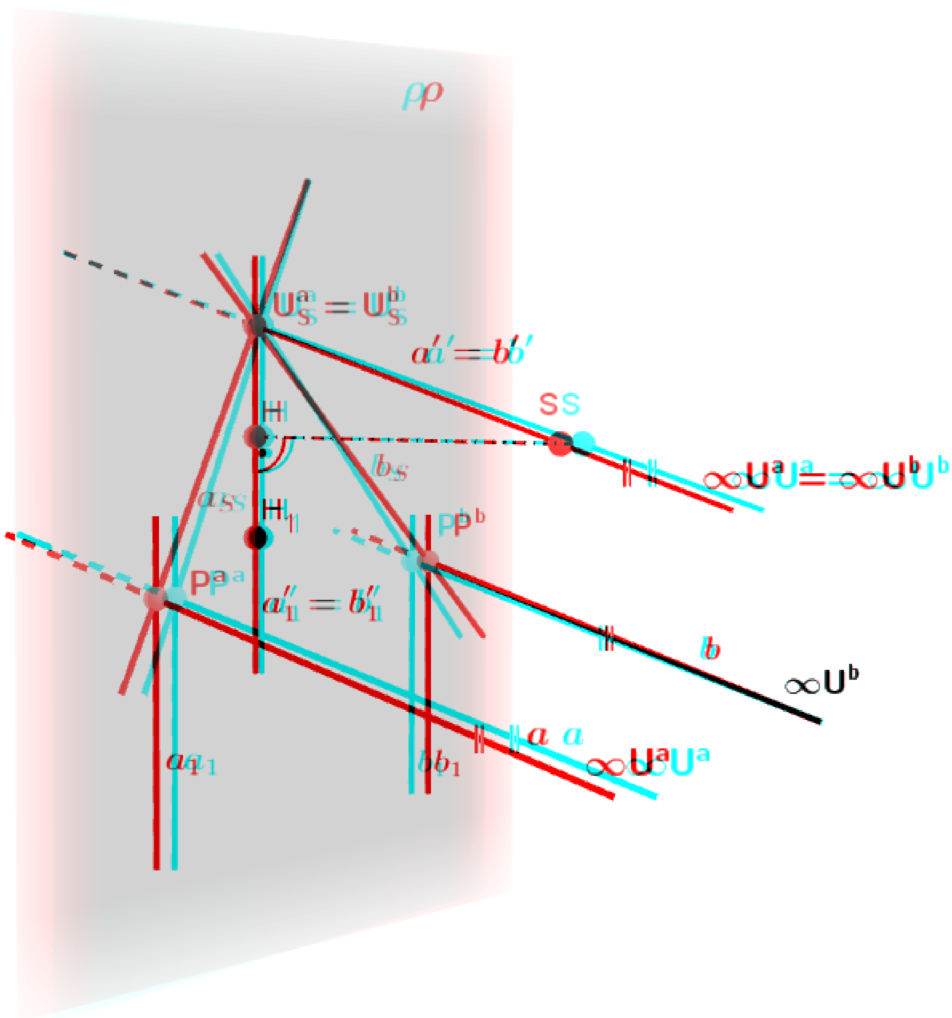
Ilustrácia pozorovania rovnobežiek ľudským okom.





Rovnobežné priamky *a, b* majú totožné smerové priamky: ***a′*** = ***b′***

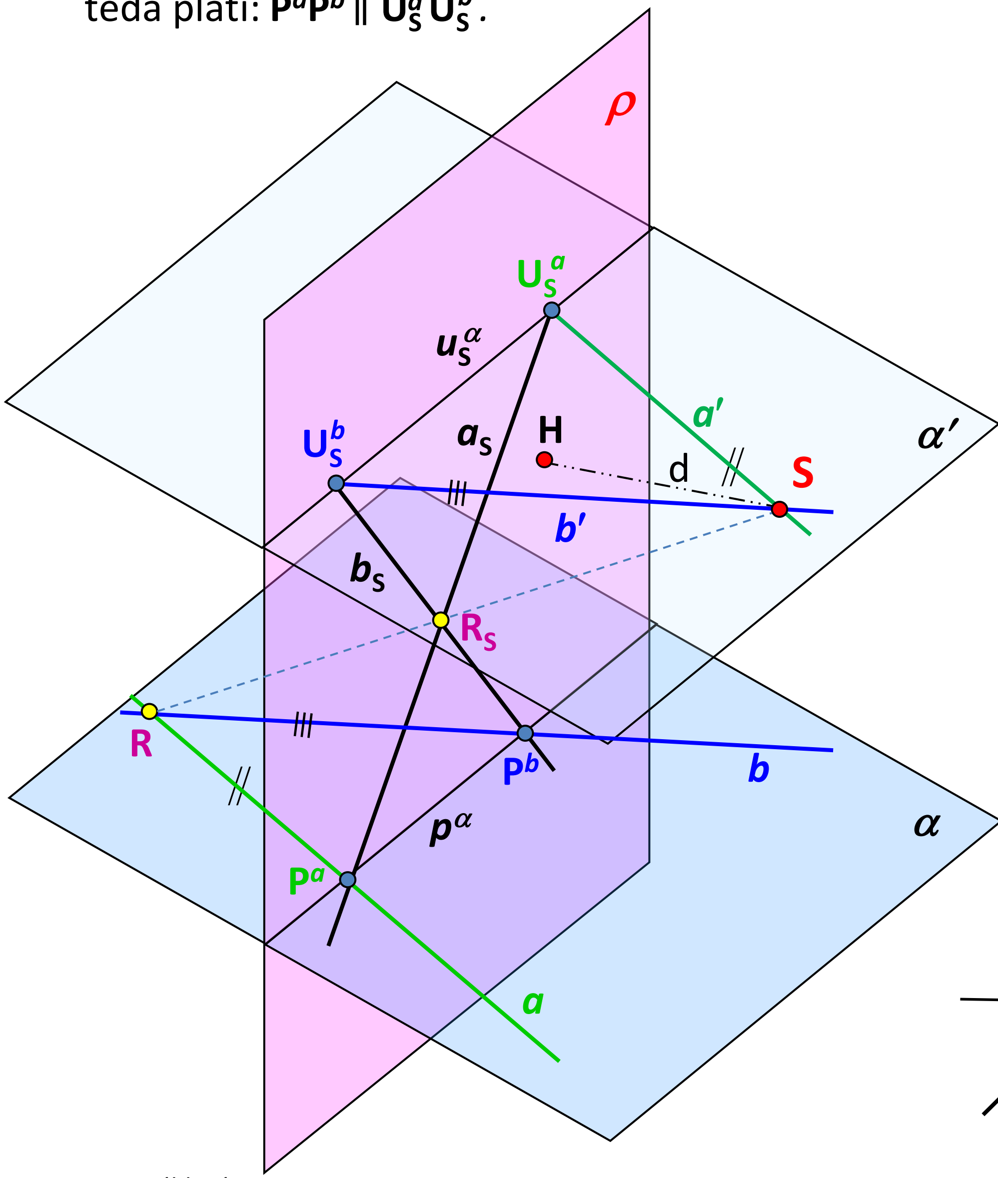
a úbežníky: $\mathbf{U}_S^a = \mathbf{U}_S^b$.

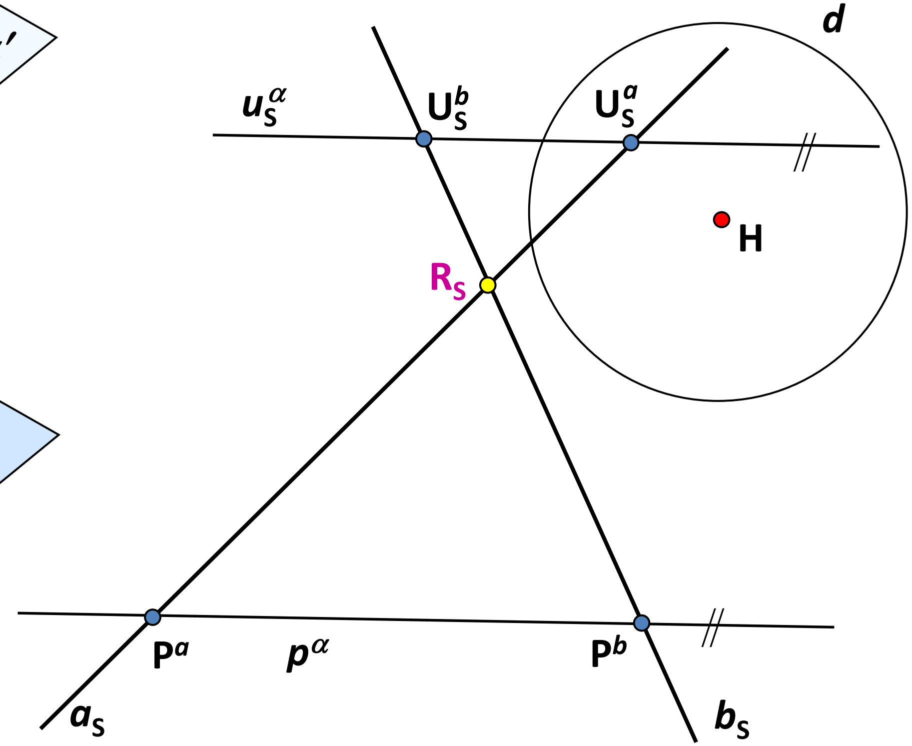


Vzájomná poloha dvoch priamok v stredovom premietaní

2. Rôznobežné priamky *a*, *b* **–** existuje rovina $\alpha(\boldsymbol{a}, \boldsymbol{b})$, $\boldsymbol{p}^{\alpha} = \mathbf{P}^{a}\mathbf{P}^{b}$, $\boldsymbol{u}_{S}^{\alpha} = \mathbf{U}_{S}^{a}\,\mathbf{U}_{S}^{b}$,

teda platí: $\mathbf{P}^{a}\mathbf{P}^{b} \parallel \mathbf{U}_{S}^{a}\,\mathbf{U}_{S}^{b}$.

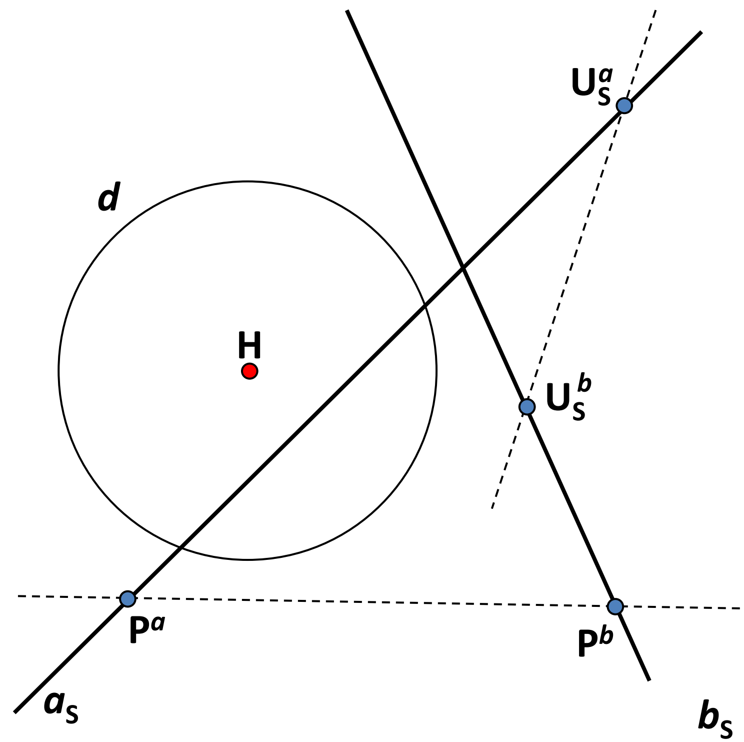




Vzájomná poloha dvoch priamok v stredovom premietaní

3. Mimobežné priamky a, b **–** neplatia pravidlá pre rovnobežné a rôznobežné priamky.

Ukážka obrazu dvojice mimobežných priamok v stredovom premietaní:

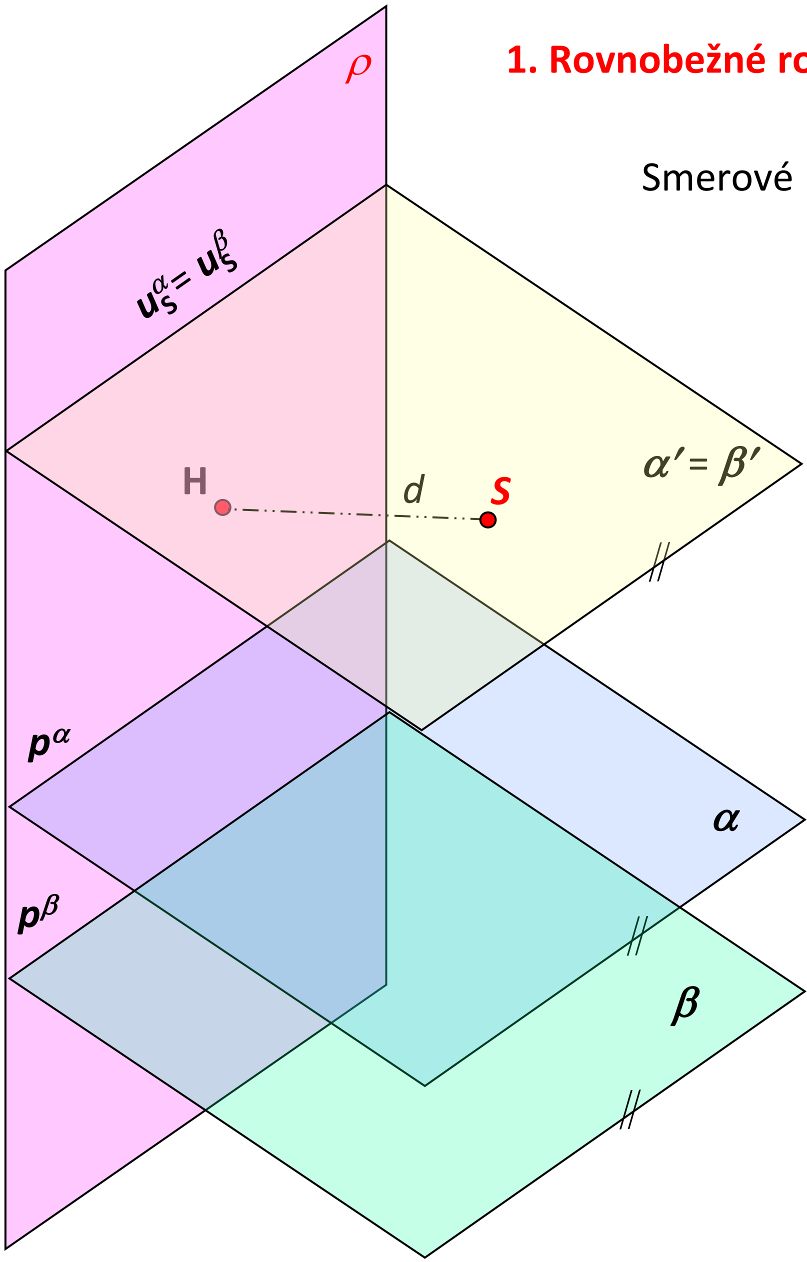


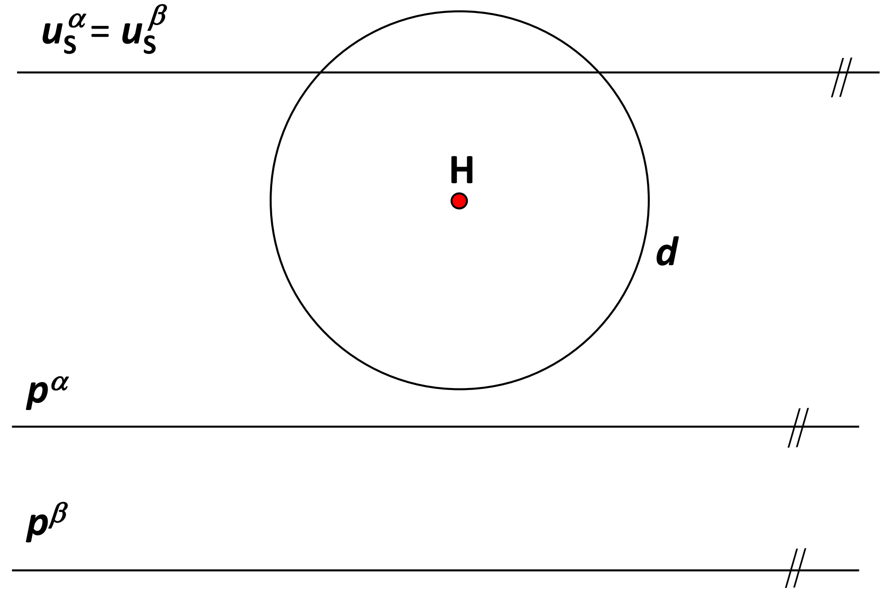
Mimobežné priamky ***a***, ***b*** neležia v rovine, teda platí: $\mathbf{P}^a\mathbf{P}^b \nparallel \mathbf{U}_S^a\,\mathbf{U}_S^b$.

Vzájomná poloha dvoch rovín v stredovom premietaní

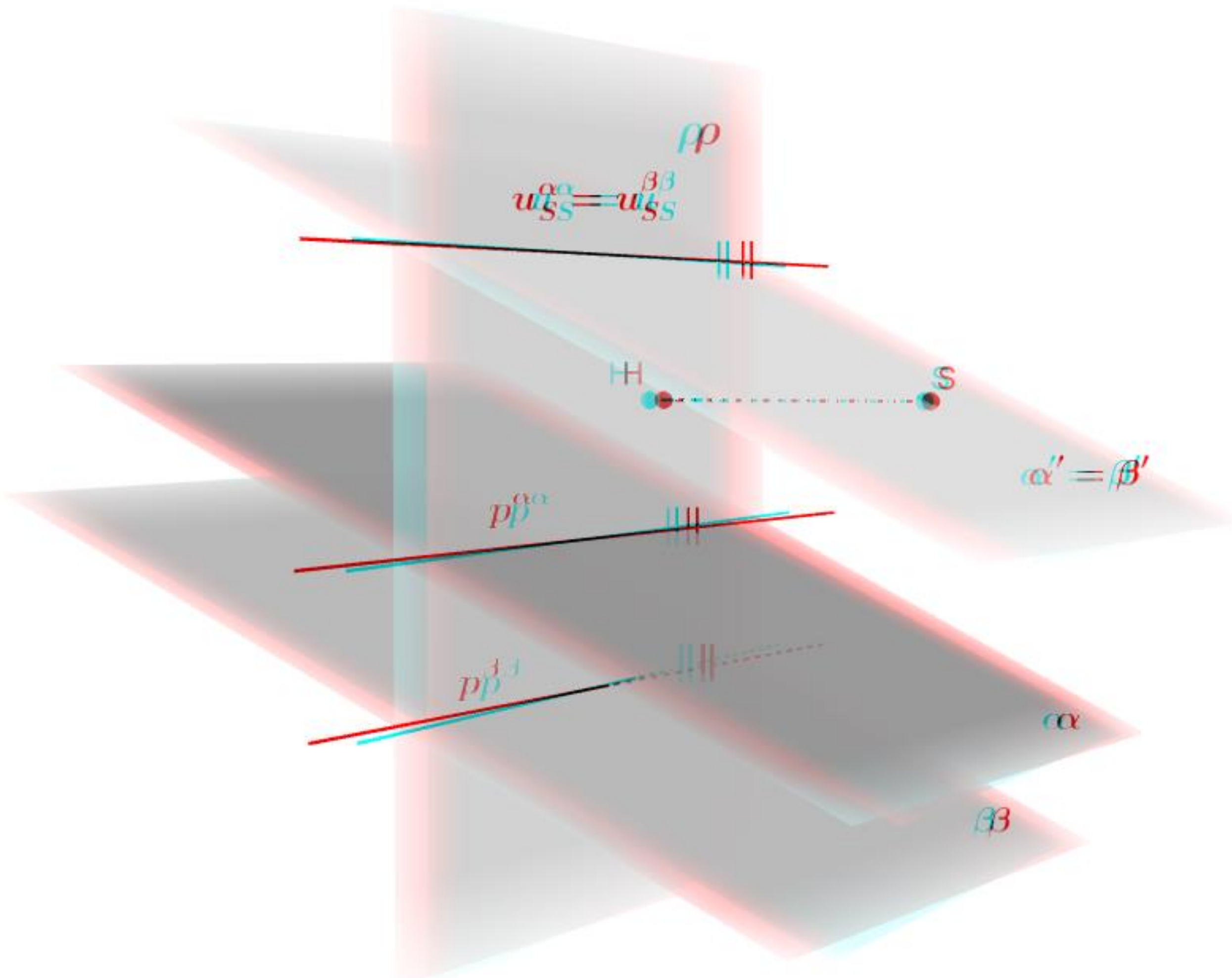
1. Rovnobežné roviny α, β – $\alpha \parallel \beta$, potom platí $u_S^\alpha = u_S^\beta$.

Smerové roviny rovnobežných rovín sú totožné: $\alpha' = \beta'$.



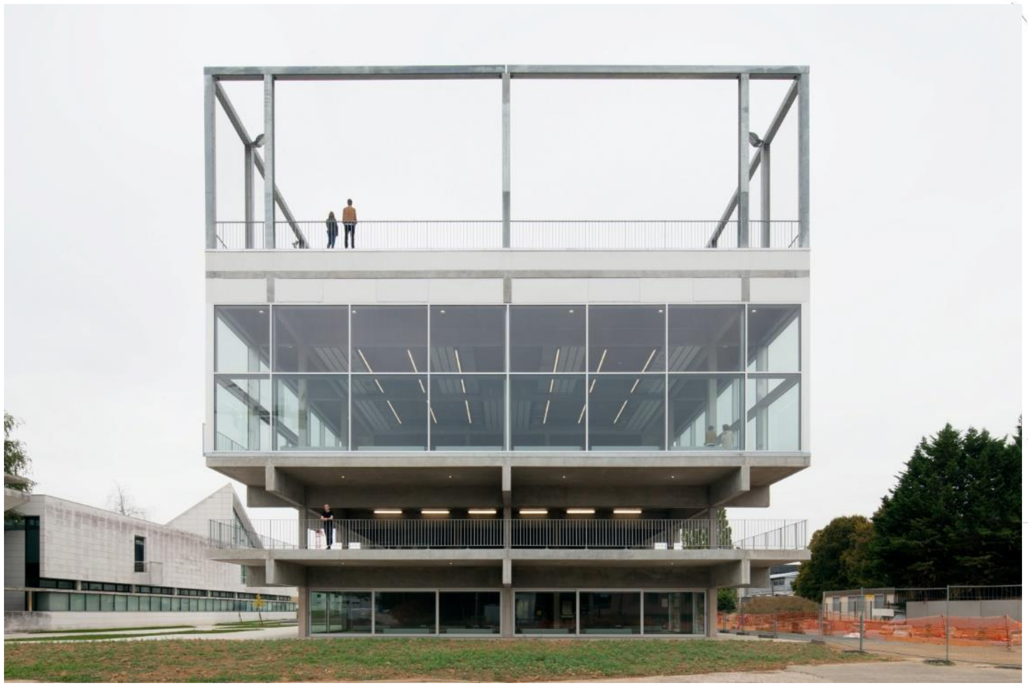


Rovnobežné roviny α**,** β majú totožné smerové roviny $\alpha' = \beta'$
a úbežnice $u_S^\alpha = u_S^\beta$.

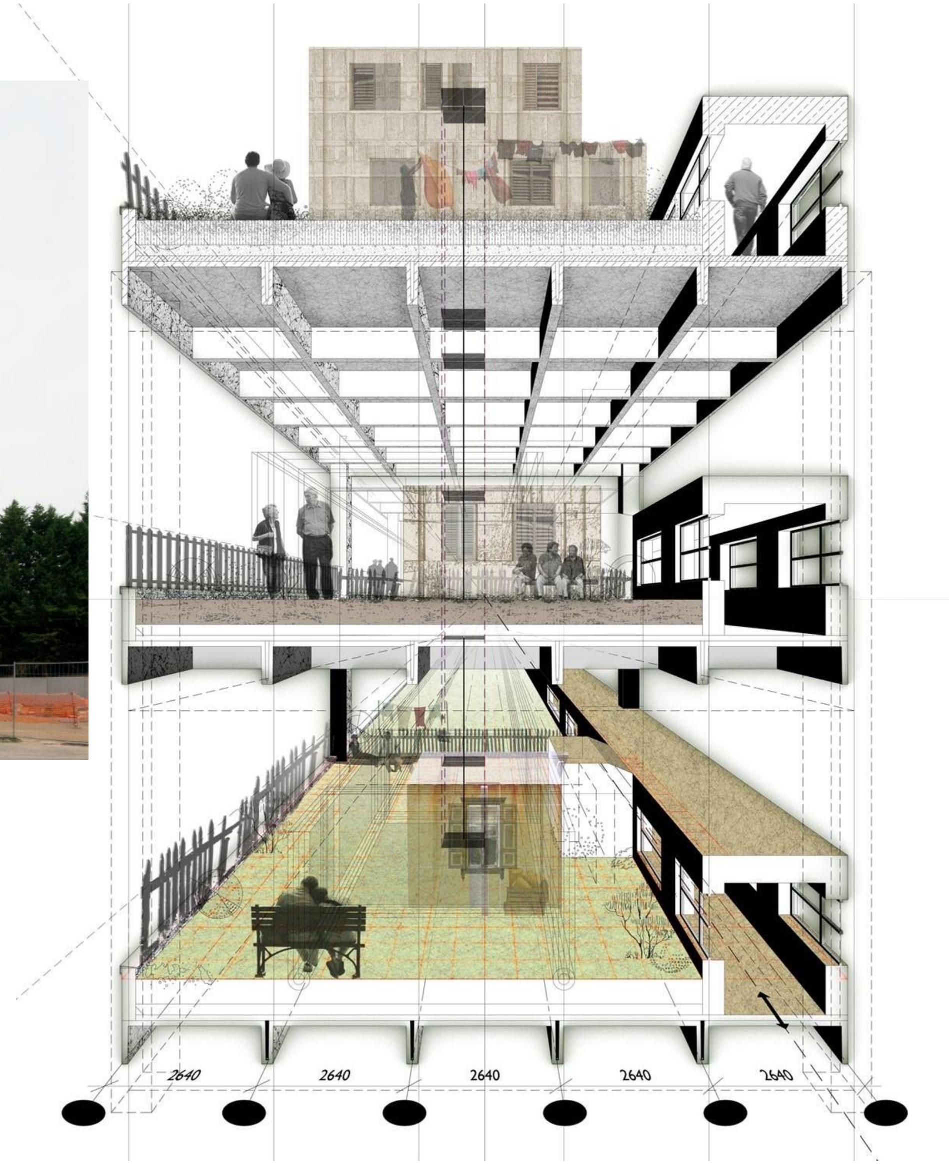


Príklady rovnobežných rovín v stredovom premietaní v stavebnej praxi

https://fonds-perspektive.de/archiv/2020/die-architektur-des-realen-in-frankreich/



https://www.pinterest.com/dianakuch/drawings/



Príklad 12.5: V stredovom premietaní danom (**H**, d) zostrojte bodom **B**[**B**$_1$, **B**$_S$] rovinu β, ktorá je rovnobežná s rovinou α (p^α, u_S^α).

Postup:

1. Úbežnica roviny β je totožná s úbežnicou roviny α:

$u_S^\alpha = u_S^\beta$.

2. Bodom **B** zostrojíme spádovú priamku roviny β:

- smerová priamka spádových priamok roviny β,

  H $\in s_1^{\beta\prime}$, $s_1^{\beta\prime} \perp u_S^\beta$,

- úbežník $\mathbf{U}_S^s$ spádových priamok roviny β,

  $\mathbf{U}_S^s = s_1^{\beta\prime} \cap u_S^\beta$,

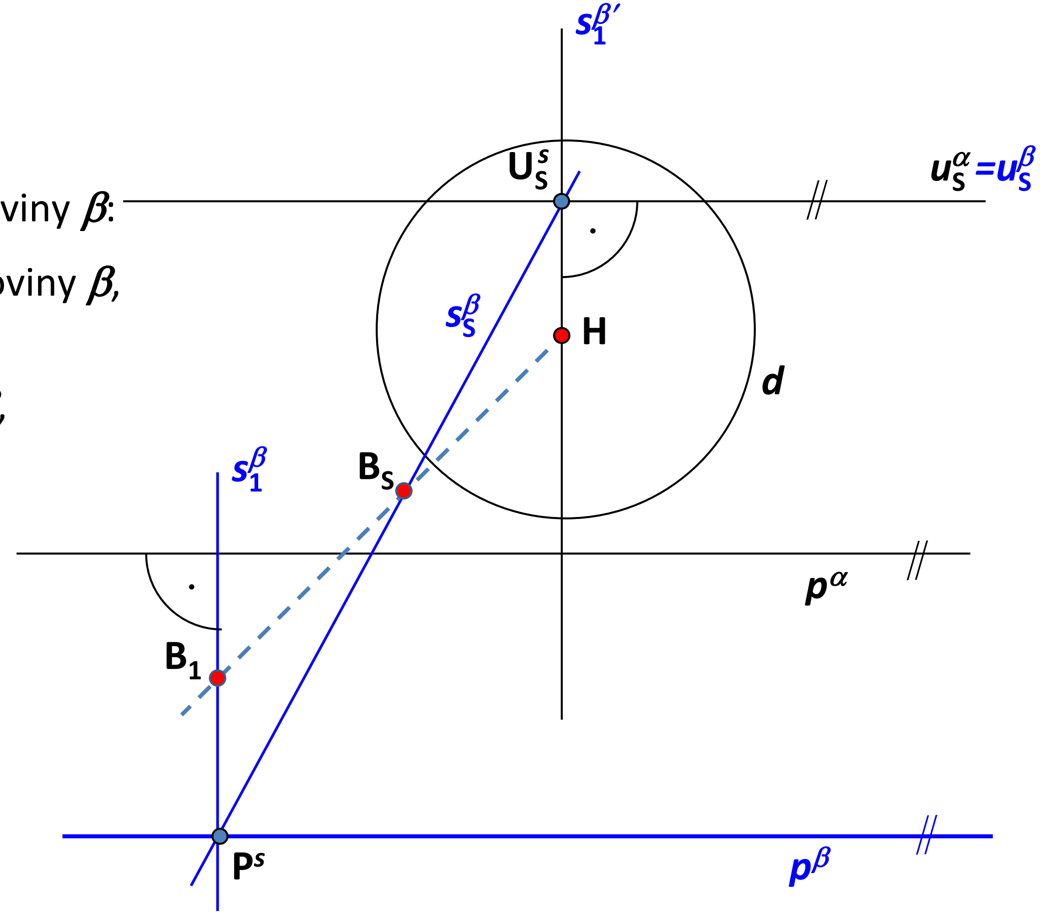
- spádová priamka roviny β bodom **B**:

  $s_S^\beta = \mathbf{U}_S^s\mathbf{B}_S$, s_1^β: $\mathbf{B}_1 \in s_1^\beta$, $s_1^\beta \perp p^\alpha$.

  $\mathbf{P}^s = s_S^\beta \cap s_S^\beta$.

3. Zostrojíme stopu p^β roviny β:

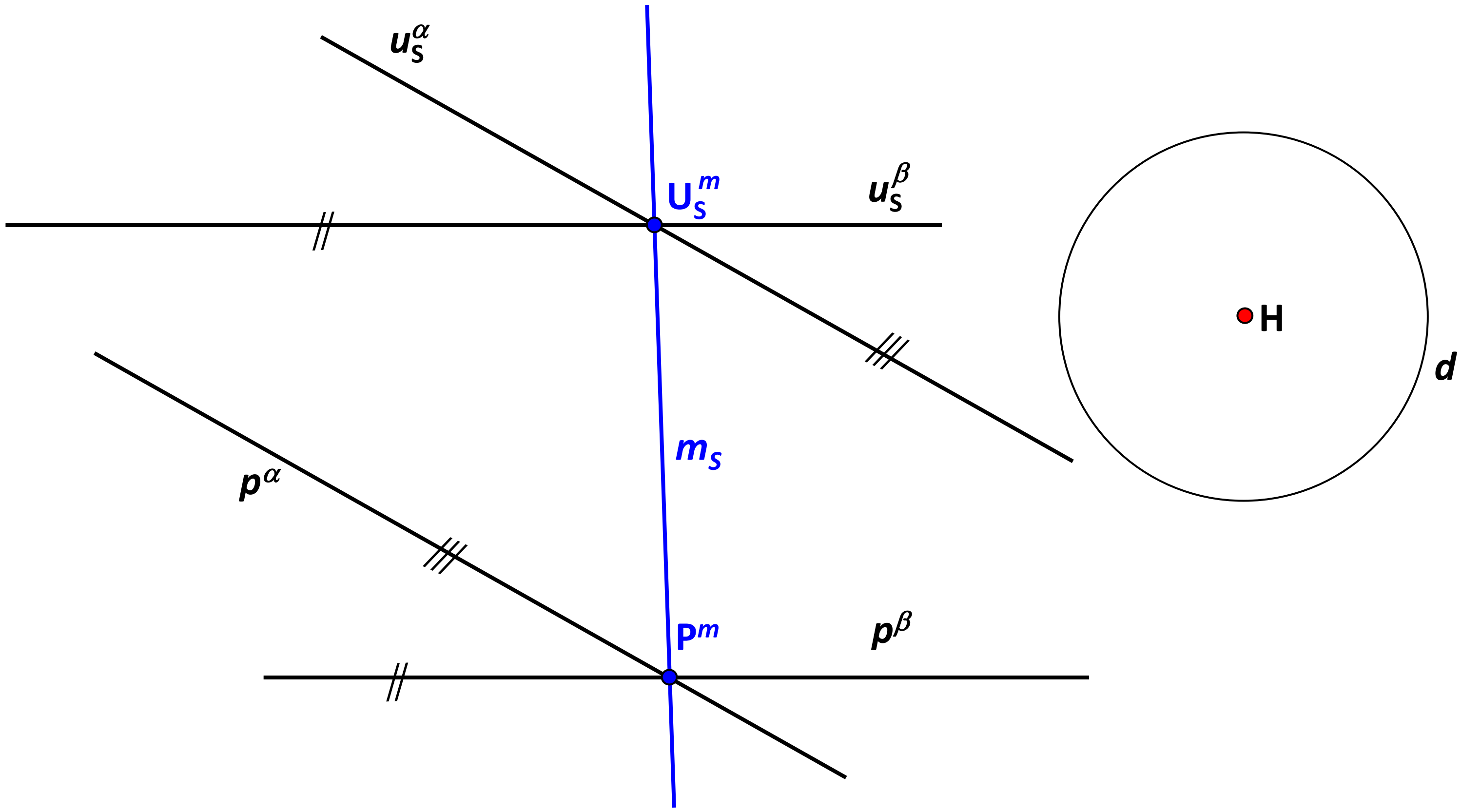
$\mathbf{P}^s \in p^\beta$, $p^\beta \parallel p^\alpha$.



Vzájomná poloha dvoch rovín v stredovom premietaní

2. Rôznobežné roviny α, β: $\alpha \cap \beta = m$, potom $P^m = p^\alpha \cap p^\beta$, $U_S^m = u_S^\alpha \cap u_S^\beta$

(ak priesečnica m nie je rovnobežná s priemetňou ρ).

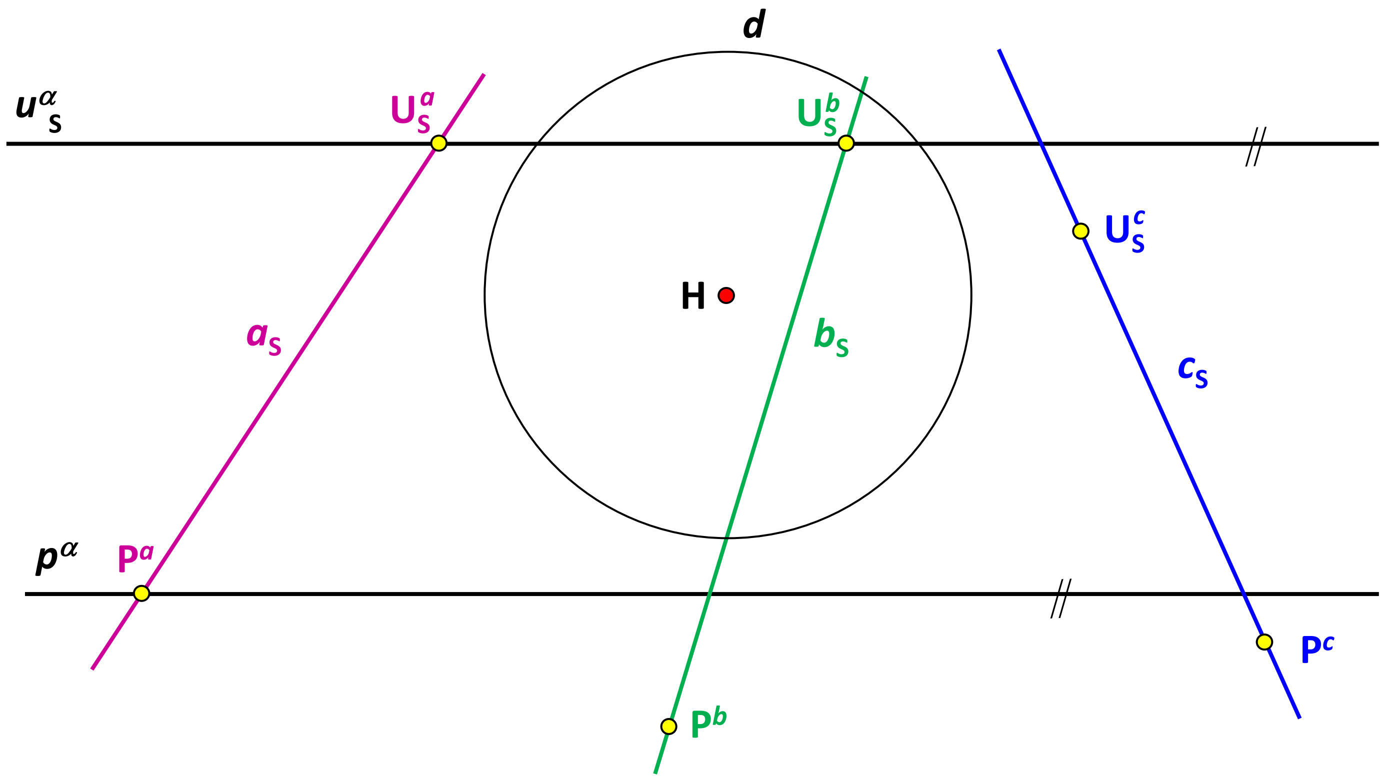


Vzájomná poloha priamky a roviny v stredovom premietaní

1. Priamka $\boldsymbol{a}$ leží v rovine α, potom $\mathbf{P}^{a} \in \boldsymbol{p}^{\alpha}$, $\mathbf{U}^{a}_{S} \in \boldsymbol{u}^{\alpha}_{S}$.

2. Priamka $\boldsymbol{b}$ je rovnobežná s rovinou α, potom $\mathbf{P}^{b} \notin \boldsymbol{p}^{\alpha}$, $\mathbf{U}^{b}_{S} \in \boldsymbol{u}^{\alpha}$.

3. Priamka $\boldsymbol{c}$ je rôznobežná s rovinou α, potom $\mathbf{P}^{c} \notin \boldsymbol{p}^{\alpha}$ a $\mathbf{U}^{c}_{S} \notin \boldsymbol{u}^{\alpha}_{S}$.



Príklad 12.6: V stredovom premietaní danom (**H**, d) zostrojte prienik priamky $\boldsymbol{a}(\mathbf{P}^{a}, \mathbf{U}_S^{a})$ a roviny $\alpha\,(\boldsymbol{p}^{\alpha}, \boldsymbol{u}_S^{\alpha})$.

Postup:

1. Priamkou ***a*** vedieme ľubovoľnú rovinu β:
   potom $\mathbf{P}^{a} \in \boldsymbol{p}^{\beta}$, $\mathbf{U}_S^{a} \in \boldsymbol{u}_S^{\beta}$, $\boldsymbol{u}_S^{\beta} \parallel \boldsymbol{p}^{\beta}$.

2. Zostrojíme priesečnicu $\boldsymbol{m} = \alpha \cap \beta$:
   $\mathbf{P}^{m} = \boldsymbol{p}^{\alpha} \cap \boldsymbol{p}^{\beta}$, $\mathbf{U}_S^{m} = \boldsymbol{u}_S^{\alpha} \cap \boldsymbol{u}_S^{\beta}$, $\boldsymbol{m}_S = \mathbf{P}^{m}\mathbf{U}_S^{m}$.

3. Priesečník priamky ***a*** s rovinou α je bod **M**:
   $\mathbf{M}_S = \boldsymbol{a}_S \cap \boldsymbol{m}_S$.