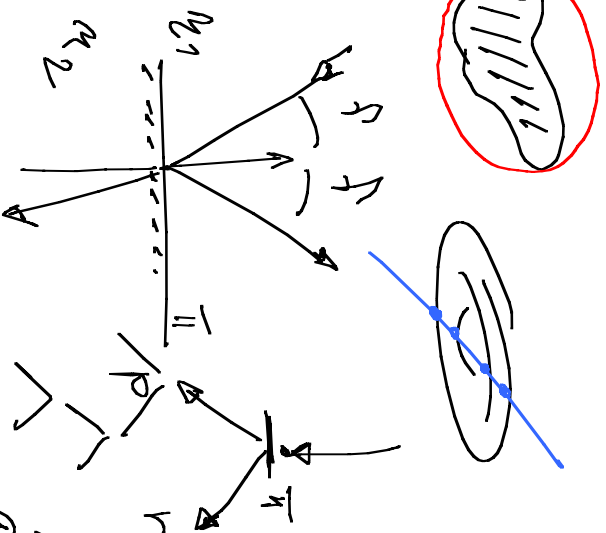
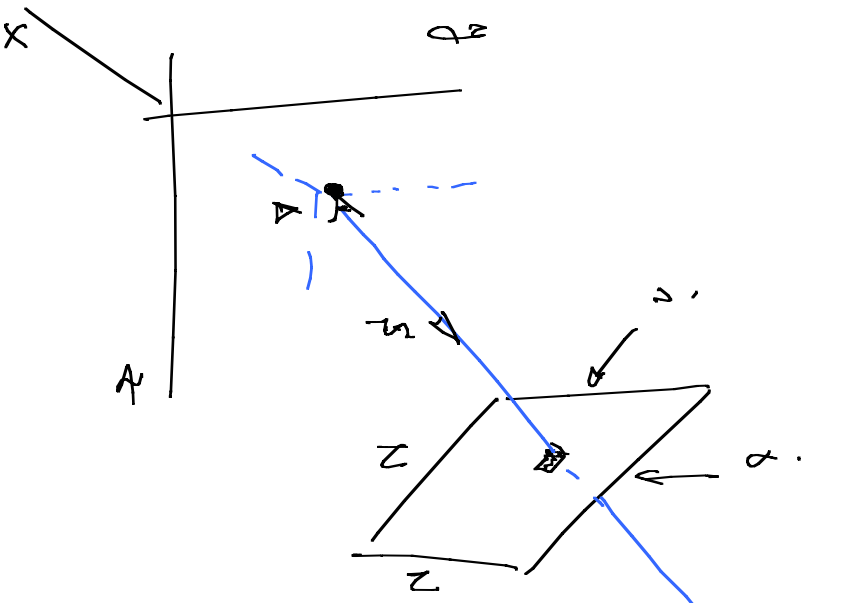


ZPG-5

Note Title

24.10.2008



$$\begin{aligned}
 x(t) &= x_A + st \\
 (x - x_S)^T (x - x_S) &= R^2 \\
 (x - x_S)^2 + (y - y_S)^2 + (z - z_S)^2 &= R^2
 \end{aligned}$$

$$at^2 + bt + c = 0$$

$$b_{1,2} = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

1) Kugel
 2) Kugel
 AA BB \Leftrightarrow Axis Aligned
 Bounding Box

$$O(n \cdot n^2 \cdot 2^k)$$

$$10^6 \cdot 10^3 \cdot 10^3$$

$$= 10^{15}$$

$\times 0.1 \text{ ms}$

$$\frac{10^{15}}{10^9 \text{ s}} = 10^6 \text{ s}$$

$D \geq 0$

Detail prostoru

prek spracovaniu
(pre processing)

ray Ray



! 2D analogie

3DDA algoritmus
seznam objektu

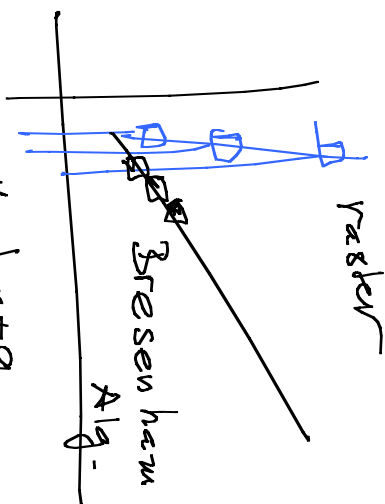
0 0 0 1 0 2 0 0 3

$$O(M \cdot N^2 \cdot Z^k)$$

svetla + interpolace
x = 1, 2, ...

koherence
pixel

Super sampling



$$y = kx + q$$

x = 1, 2, ...

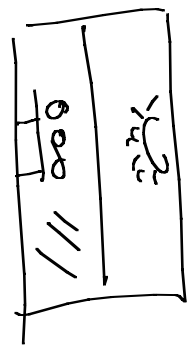
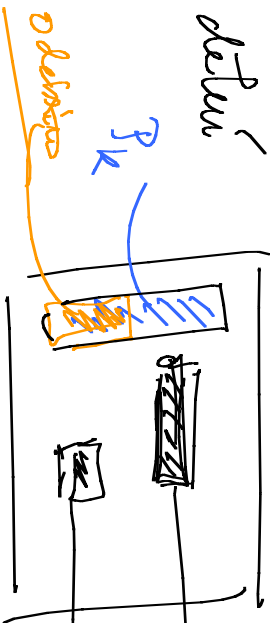
pixel



koherence

obrazovka

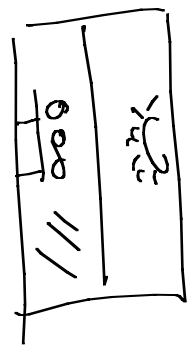
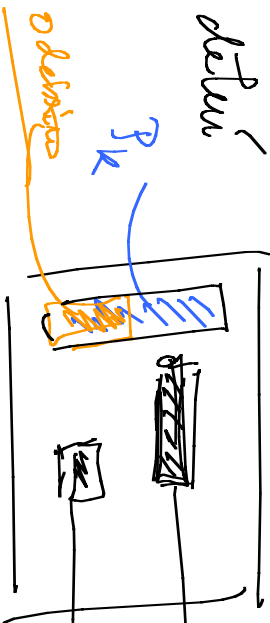
2D detail

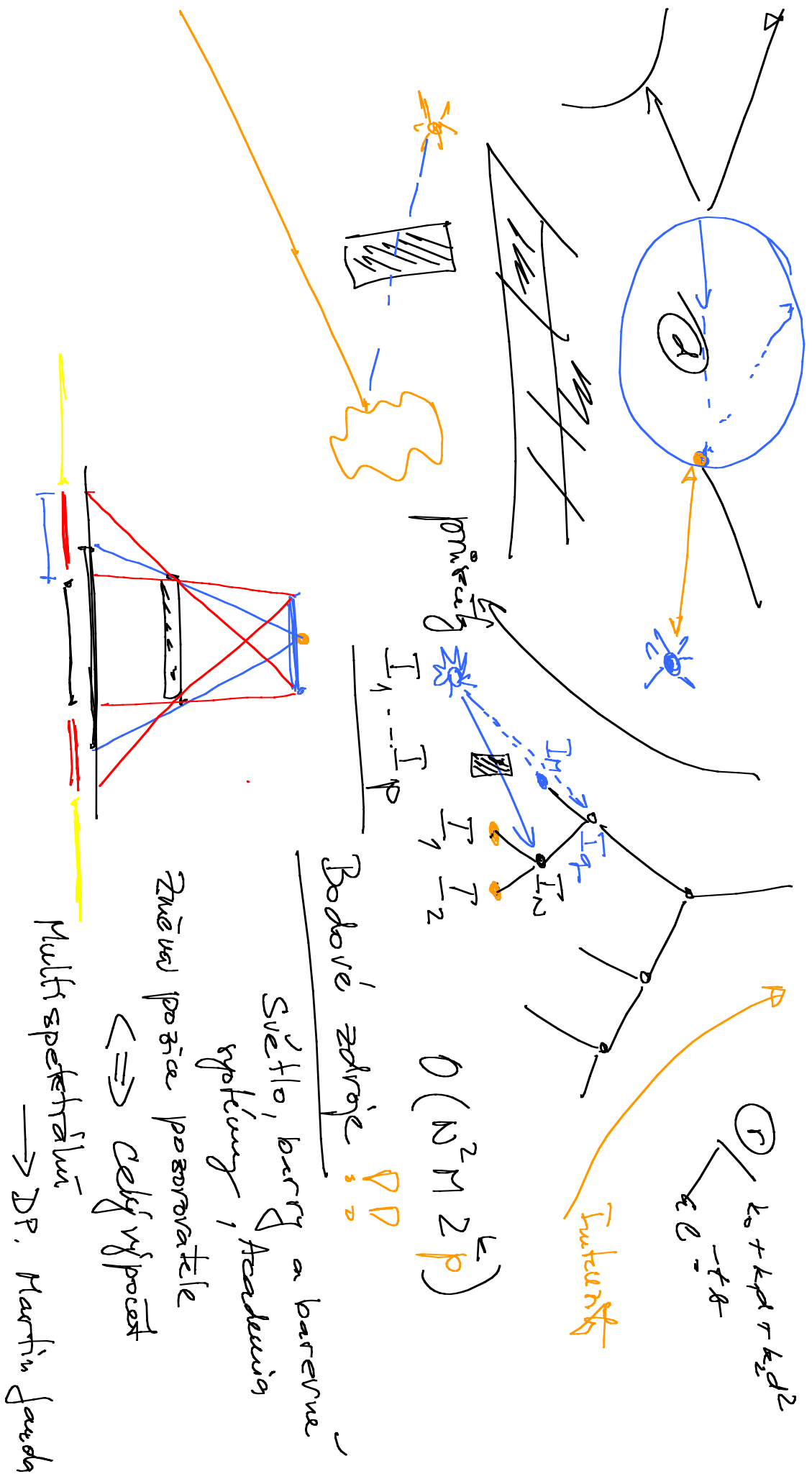


Možnosti vyhledání
paralelní spracování

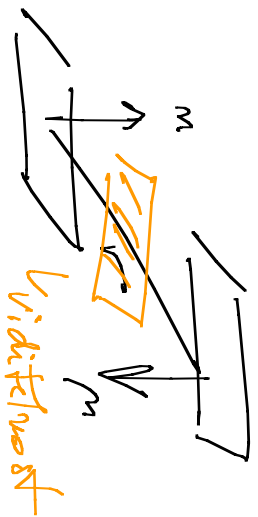
3D

2D detail





Radiation methods Radiosity



$\Rightarrow Ax = b$

- 1) $1 \times$ "Hypocot" "jak zari plochy" "povrchovate" **RENDER**
- 2) pro kachou pozisi "povrchovate" **RENDER**

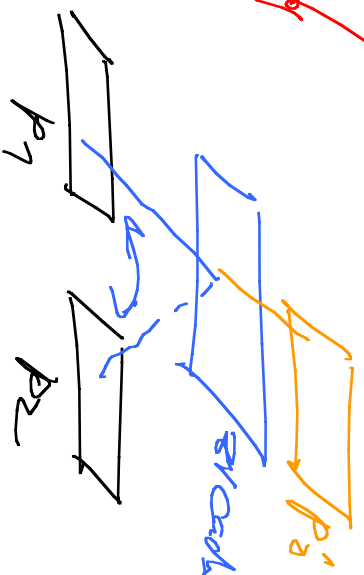
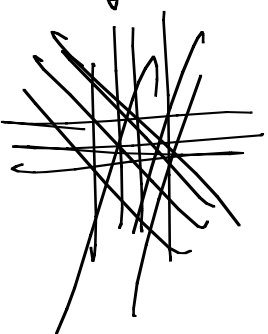
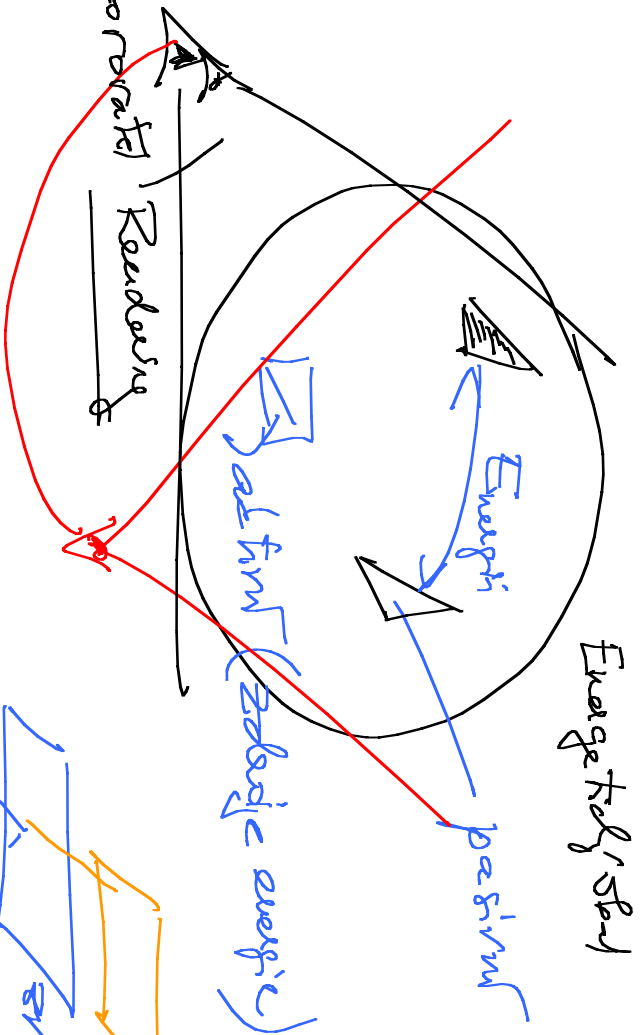
$N_D \sim 10^5$

$O(N^2)$

$O(N^3)$
 $O(N^2 \cdot L)$

Stochastické metody

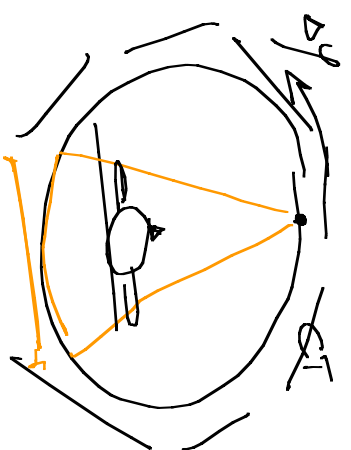
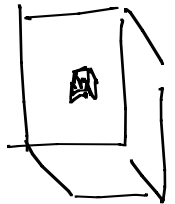
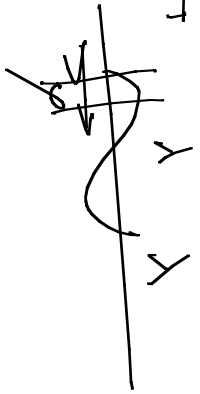
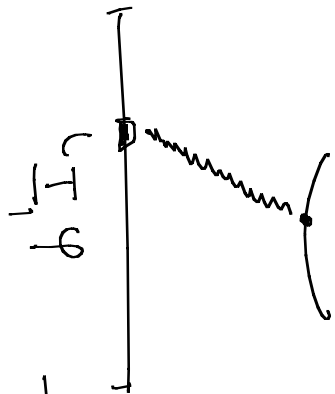
Radians



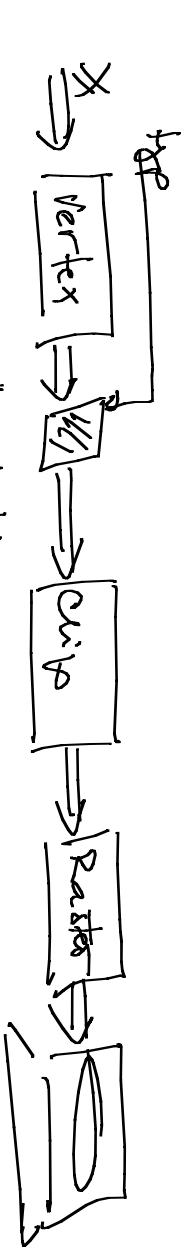
Monte Carlo

Holo. Zou. C2

↓ global
wukky

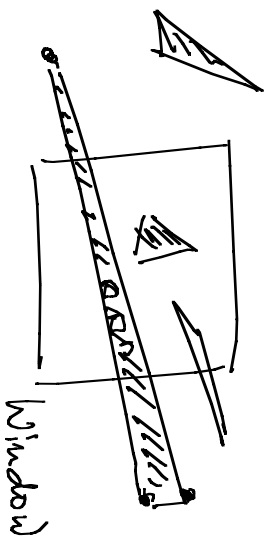
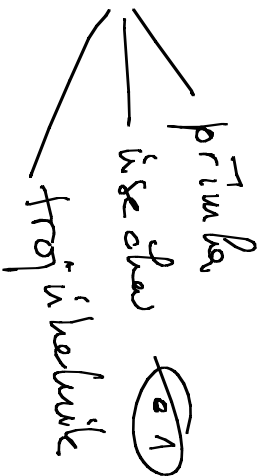


Ordering - Clipping



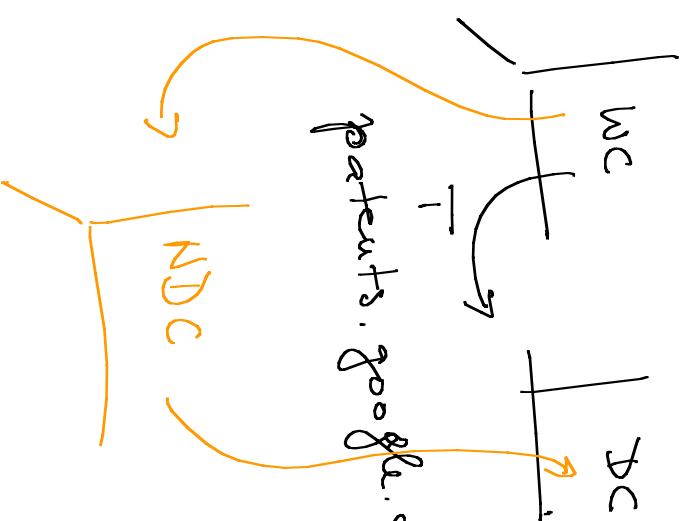
Assembly

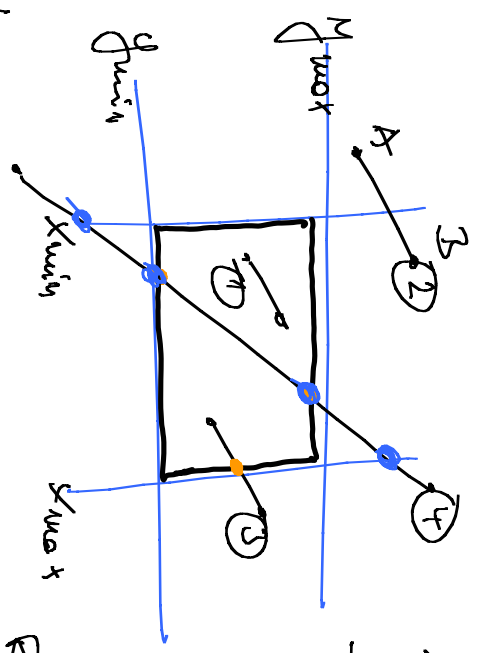
Cohen-Sutherland



patents.google.com

MDC





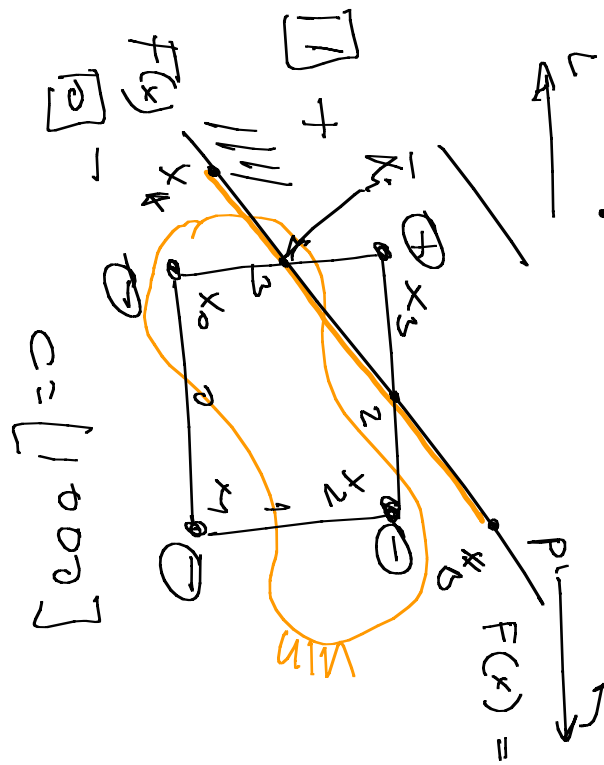
$C = [L, R, T, B]$
 $C_A = [00000]$
 $C_B = [00000]$
 $C_A \text{ or } C_B = 0 \iff 1$
 $C_A \text{ and } C_B \neq 0 \iff 2$

bedrohmarkt via Iterationen

$[x, y, 1]$

$a x + b y + c = 0$
 $C_i = F(x_i) > 0$ im parallel(e)

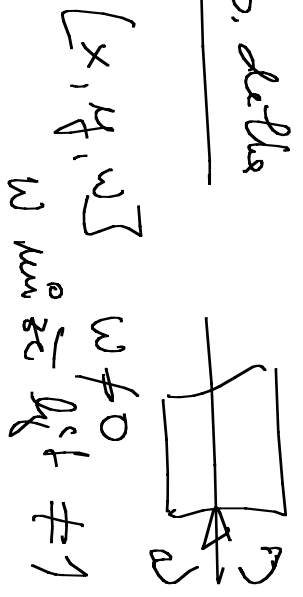
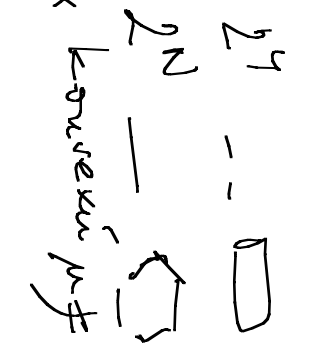
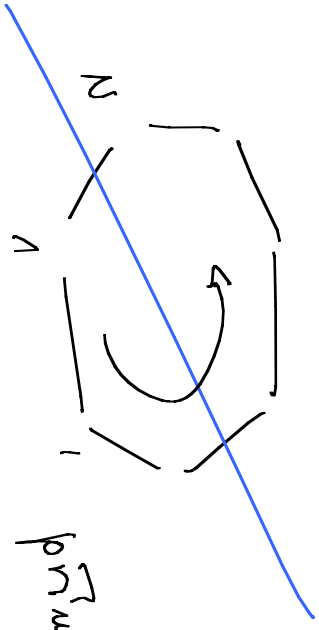
$[1 \ 0 \ 1 \ 0] \text{ N/A}$



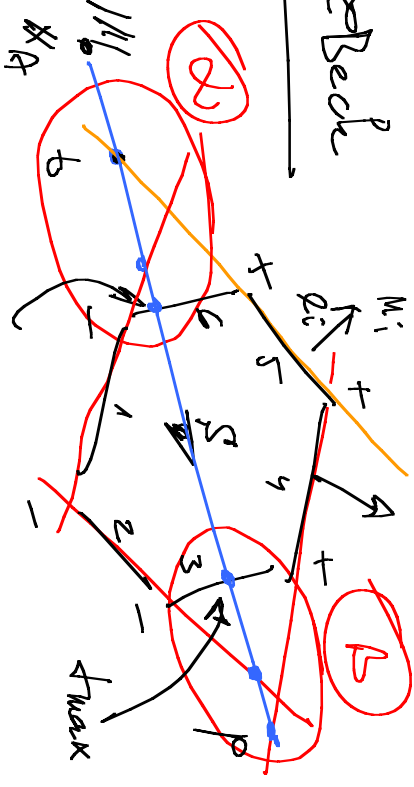
$C = [0000]$

	e_1	e_2
2		
N/A	N/A	

$10 = [1010]$
 $p \times e_2 = \bar{x}_i$
 a_i, b_i, c_i



Cyprus & Beck



Konvergenz

$p: x(t) = x_A + s t$
 $a_i \rightarrow a_i^T x + d = 0$

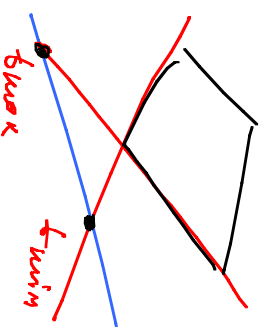
$a_i x_A + a_i^T s t + d = 0$

$t = - \frac{a_i^T x_A + d}{a_i^T s}$

$x(t_{win})$
 $x(t_{max})$

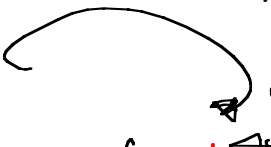
$S^T M_i < 0 \rightarrow t_{win} = \text{Max} \{ t_{win}, t \}$

$t_{max} = \text{min} \{ t_{max}, t \}$



$t_{win} > t_{max} \rightarrow$ ~~prüfung~~
 $t_{win}, t_{max} >$
 $n < 0, 1, 2$ ~~letzte~~

$t_{win} = -\infty$
 $t_{max} = +\infty$
 for all a_i



Start $O(N)$

N point vertices/lines

Singular matrix



$$t_i = -$$

$$\frac{a_i^T x_A + d_i}{a_i^T e}$$

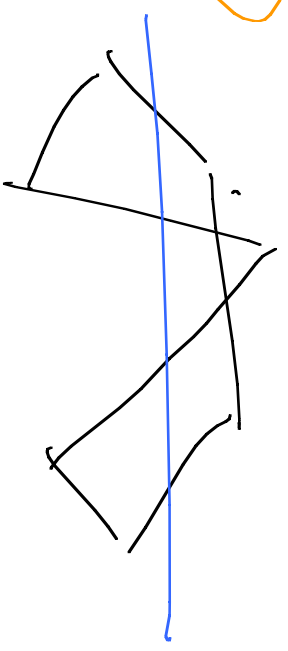
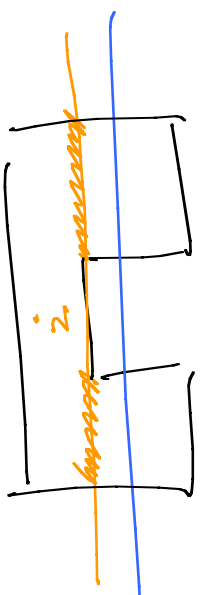
primal $p // e_i$

$$t_i = \begin{bmatrix} v_i \\ -c_{w_i} \end{bmatrix}$$

$$-c_{w_i} \geq 0$$

primal

3D Clipping

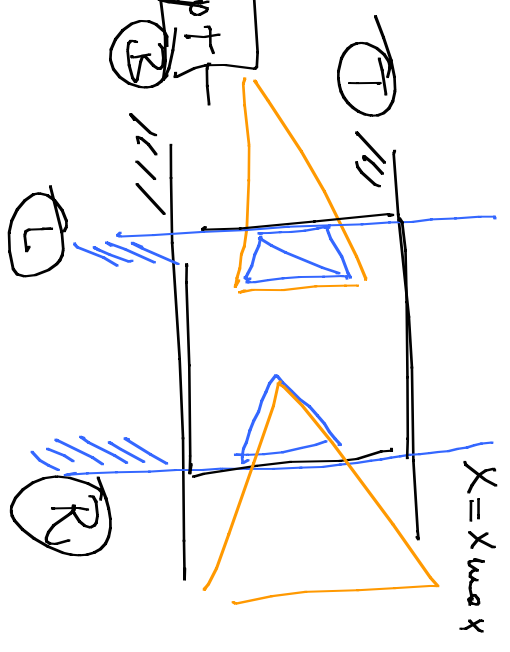
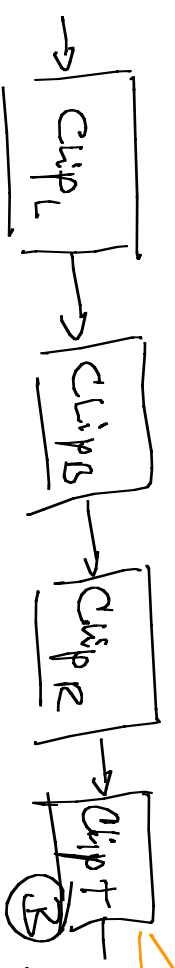


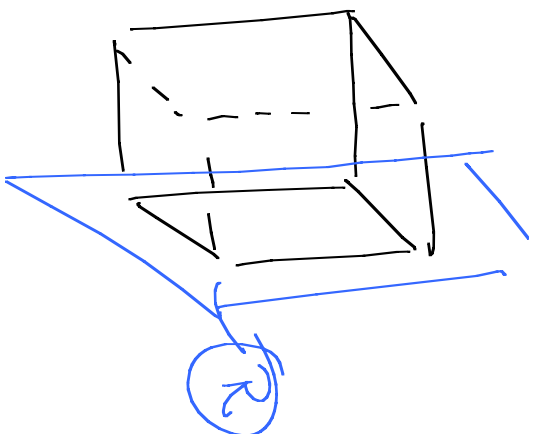
Triangle clipping



$$ax + by + c = 0$$

Hodgman





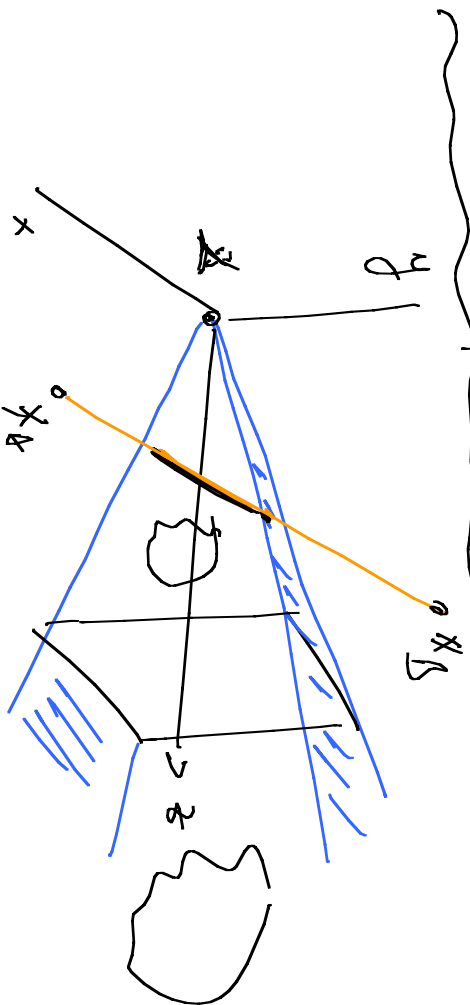
$$ax + by + cz + d = 0$$

Front
Back

Foley, Van Dam
Computer Graphics



Open View pyramiden



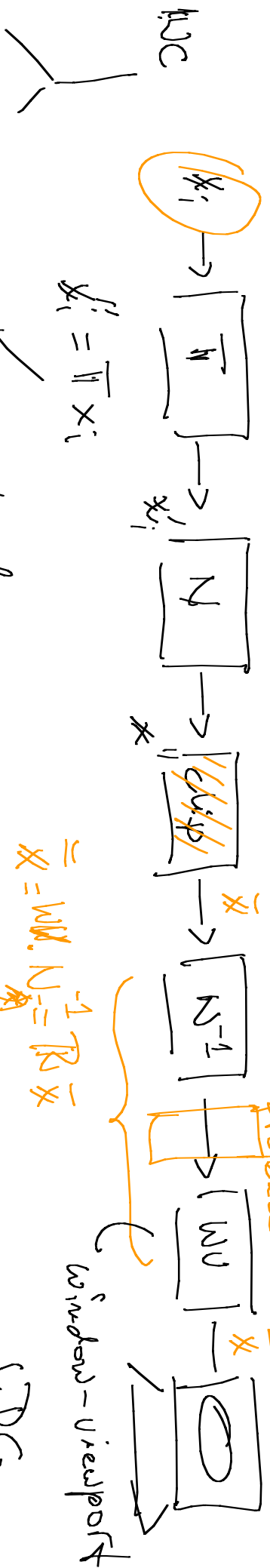
$$CS \quad E^2 \quad G = [L \ R \ B \ T]$$

$$E^2 \quad X = X_{max}$$

$$E^3 \quad ax + by + cz = 0 \quad \text{addieren}$$

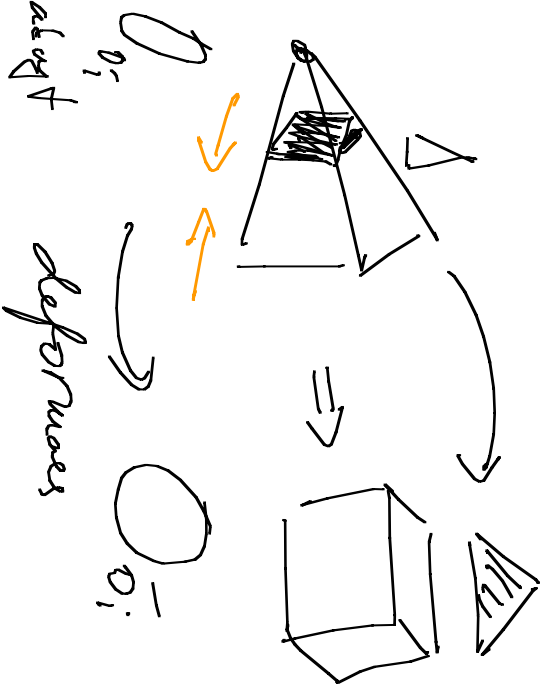
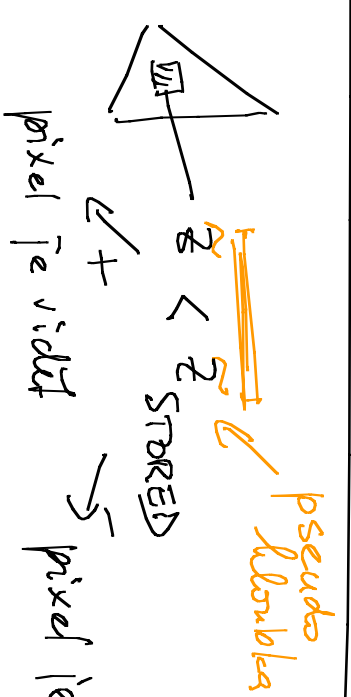
$$s_i \quad ax + cz = 0$$

$$= \pm 1/0$$



Wysledki dzielenia E_3 je E_3 primitivami!

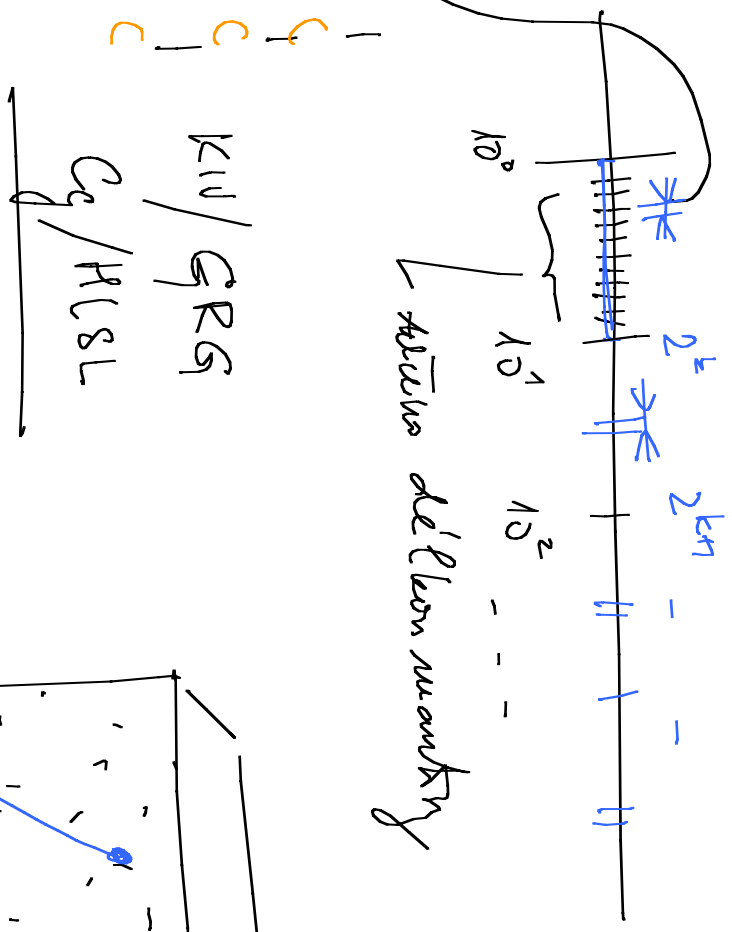
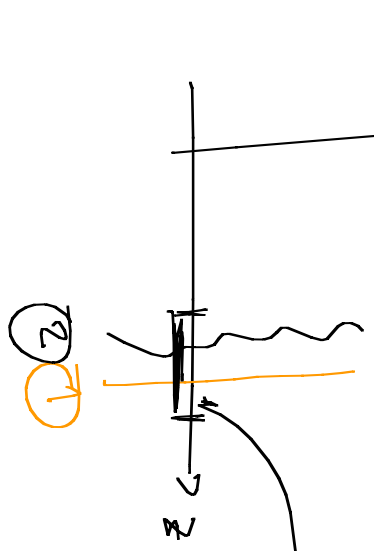
Zlupfer



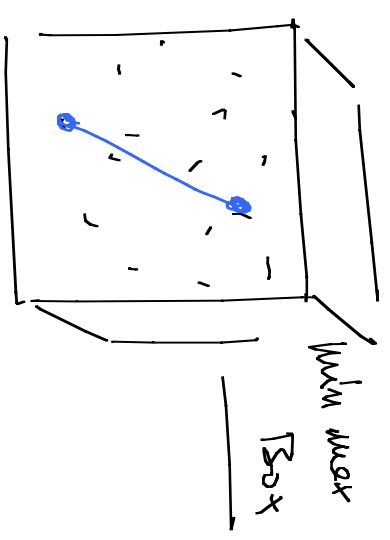
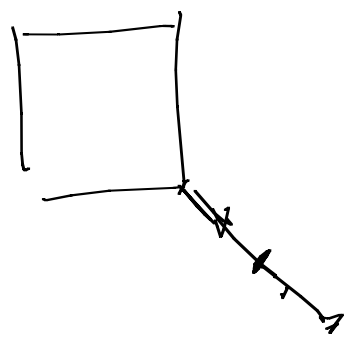
\bar{x}
 $ax + by + cz = 0$
 $* x$

kinerja presisi $\textcircled{2}$

$8/16/32$



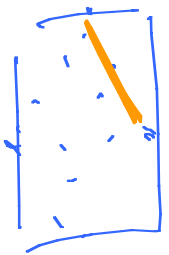
K11/GRG
G_g/HLSL



Axis
Align
Bounding
Box
AABB

F^2 -- Bounding Box

for i
 $x_{min} =$ $x_{max} =$ $O(n)$



$O(n^2)$

Algorithm cycles 5, 1, 2

Daire' strobhuy

print x = object - - -

?
 $x_{1,2,1}$
 \downarrow
 $\in \mathbb{R}$

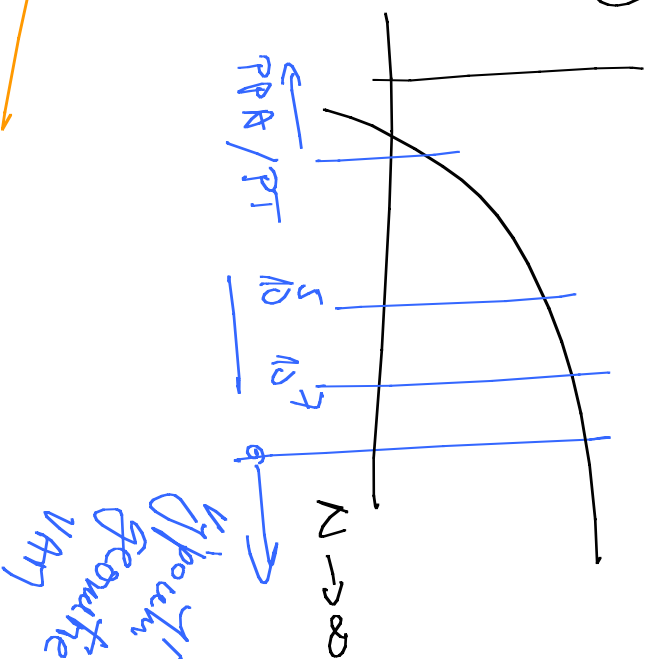
$[1..10^6]$ x

$x_{1:n}$ \downarrow \mathbb{R}^n
 $Q[1:n, 1:n]$
 $\underbrace{\hspace{10em}}$
 $R[\xi]$

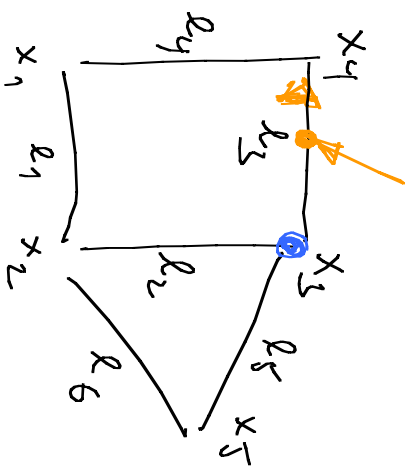
$\xi[k] = Q[i_1, j]$

$k = (i-1) \cdot n + j$
 \swarrow
 $i-1$

Q(ξ)



Bood



e	v_i	v_j
1	1	2
6	2	5

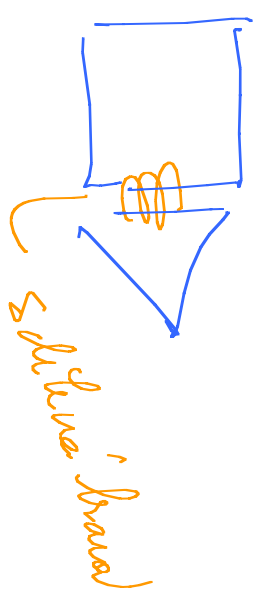
Primeri reprezentacije

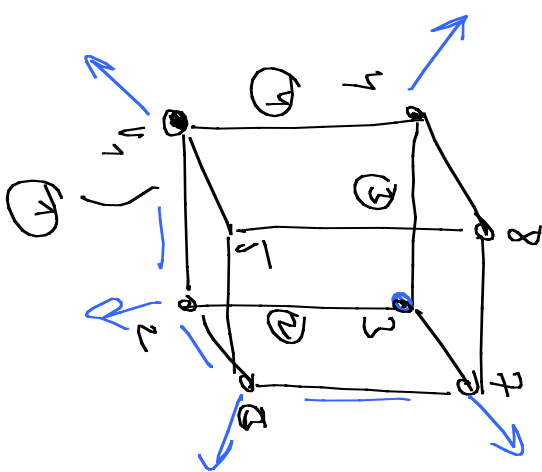
?

co je susjedstvo? e_3 ?

je li neka sklopka? v_i

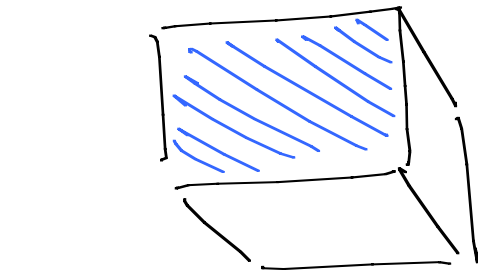
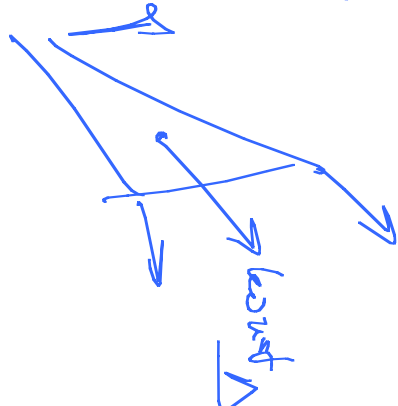
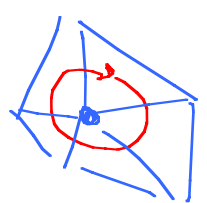
$x_3 \Rightarrow e_3, e_2, e_4$?



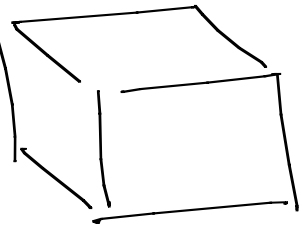


hranoví model / reprezentace

e_i	v_i	v_j
1	1	2
4	1	4



↪ 4 případy

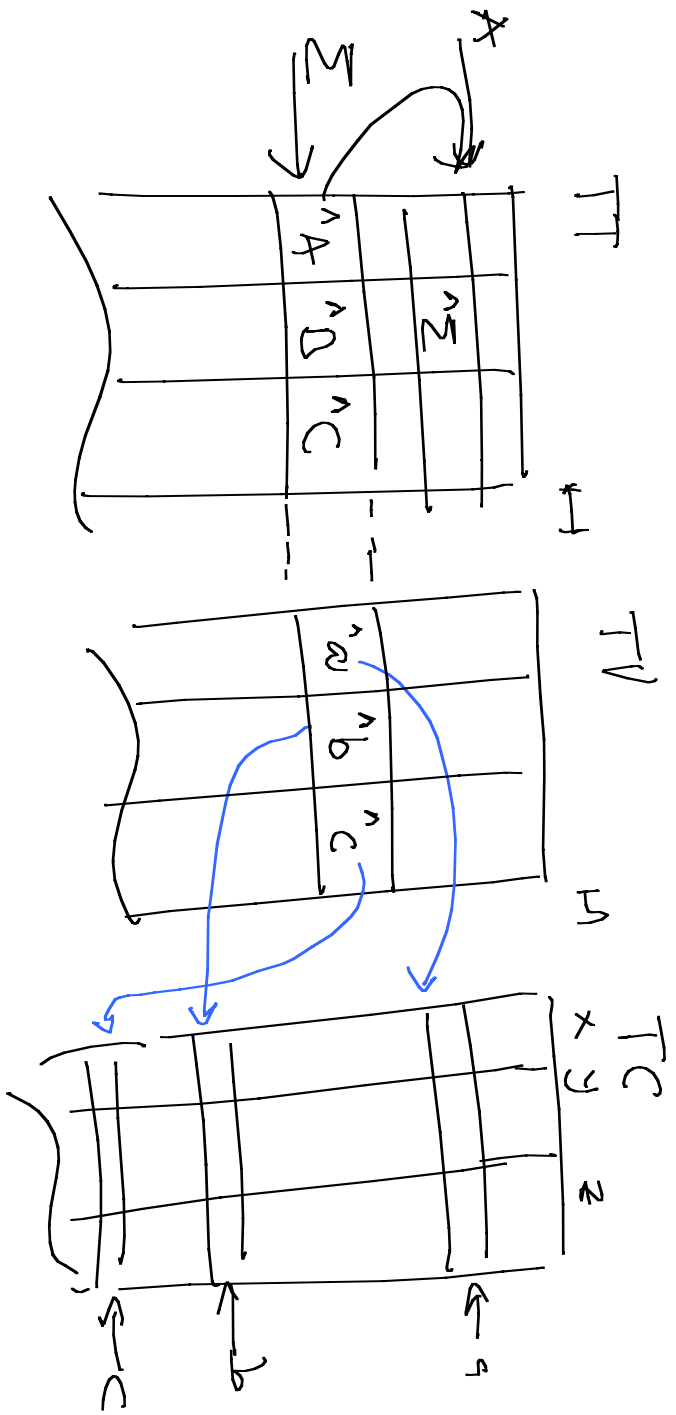
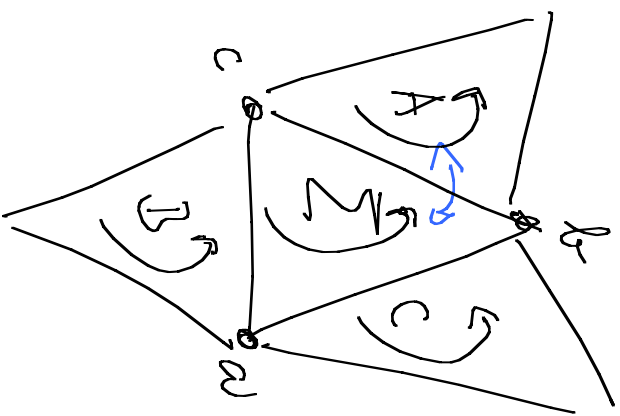
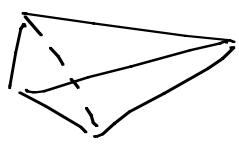
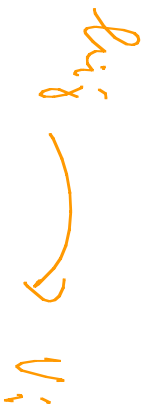
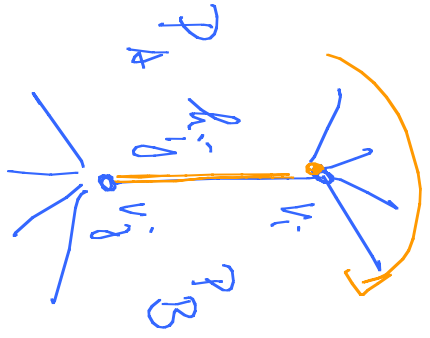


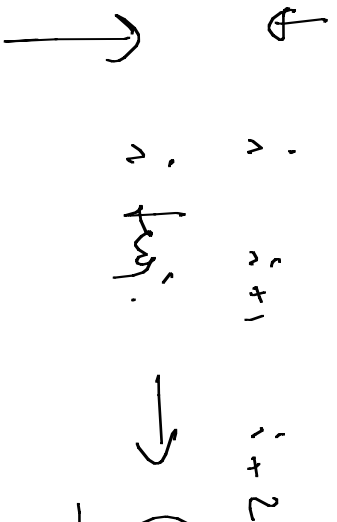
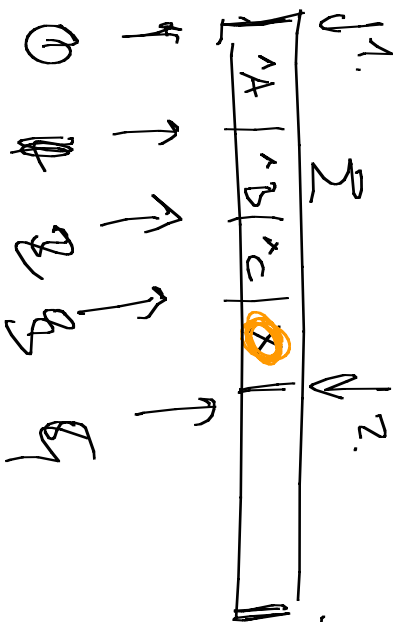
hranová reprezentace

POZNEMÍ JEDNOZNACNÁ

Plošná reprezentace

— Odrázková
hranová



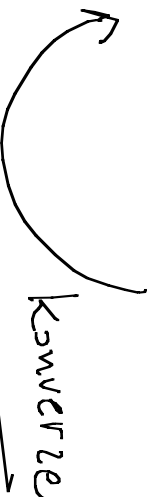
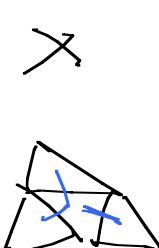


eliminate ue sch 2

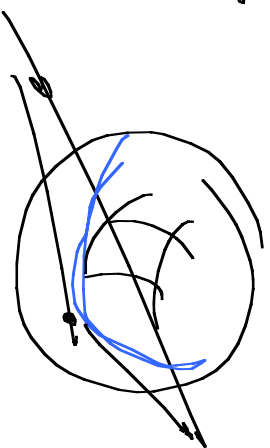
frei mel bar

sit' x { frei mel bar }
(STEP)

{ Δ_i }_{i=1}^{10^6}

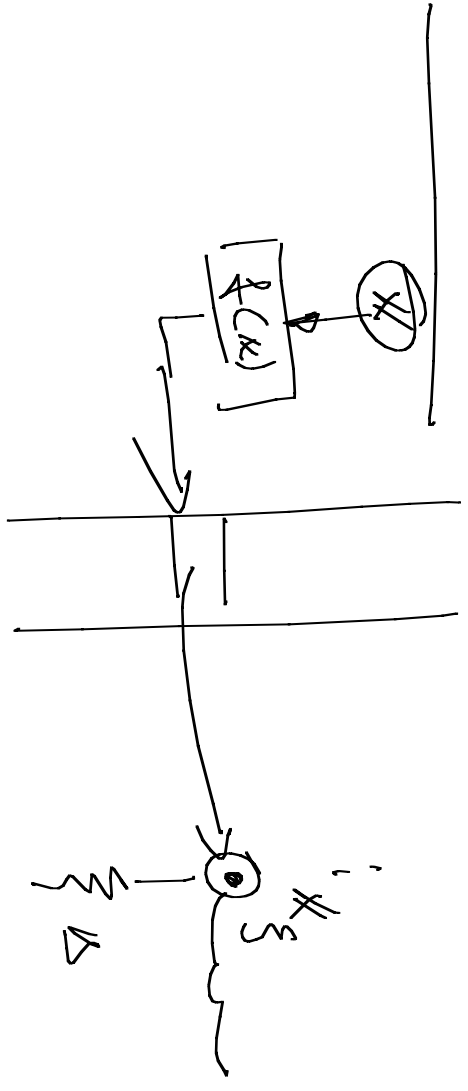


{ < x_i x_j x_k > }_{10^6}



$x_1, x_2, x_3, \dots, x_n$ \rightarrow 3 values \rightarrow n -fold Δ
 $x_{x_1} \leftarrow x_{x_2} \leftarrow x_{x_3} \dots \leftarrow x_{x_n} \Delta$

BRUTE FORCE HASH



for $i = 1$ to $N-1$ do
 for $j = i+1$ to N do
 for $k = 1$ to n

