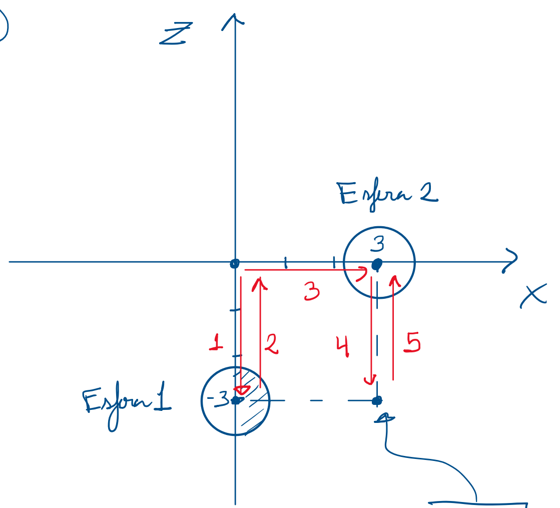
Teste 22/23

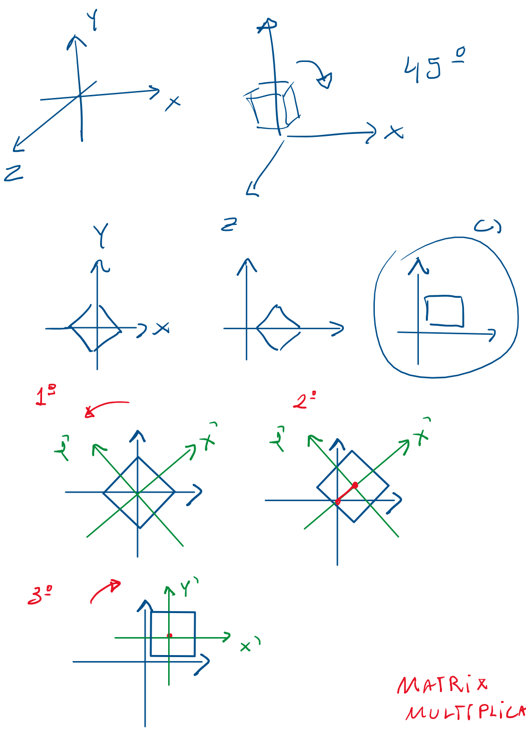
16 de maio de 2024 21:42

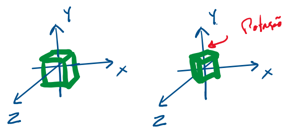
1



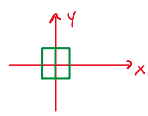
gluLookAt (3 , 0 , -3 → posição
3 , 0 , 0 → direção
0 , 1 , 0) → up vector

2





glRotate (45, 0, 1, 0)



MATRIX MULTIPLICATION . . .

$\underbrace{1 \times 4 + 0 \times 0 + 0 \times 0 + 1 \times 0}$

3 a)

$$\begin{bmatrix} \boxed{1\ 0\ 0\ 1} \\ 0\ 1\ 0\ 1 \\ 0\ 0\ 1\ 1 \\ 0\ 0\ \ \ 1 \end{bmatrix} \times \begin{bmatrix} 4 & 0 & 0 & 0 \\ 0 & 4 & 0 & 0 \\ 0 & 0 & 4 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} = \begin{bmatrix} 4 & 0 & 0 & \underbrace{1} \\ & \dots & & \\ & & & \\ & & & \end{bmatrix}$$

R: Incorreta

Devia ser = a 4

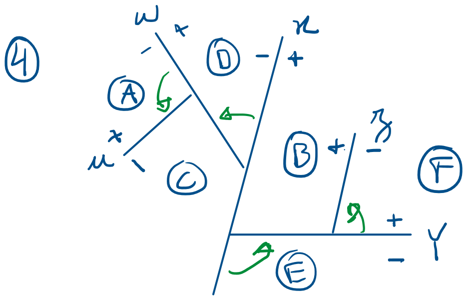
b)

$$\begin{bmatrix} 1 & 0 & 0 & 4 \\ 0 & 1 & 0 & 4 \\ 0 & 0 & 1 & 4 \\ 0 & 0 & 0 & 1 \end{bmatrix} \times \begin{bmatrix} 4 & 0 & 0 & 0 \\ 0 & 4 & 0 & 0 \\ 0 & 0 & 4 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} = \begin{bmatrix} 4 & 0 & 0 & 4 \\ 0 & 4 & 0 & 4 \\ 0 & 0 & 4 & 4 \\ 0 & 0 & 0 & 1 \end{bmatrix}$$

R: Correta

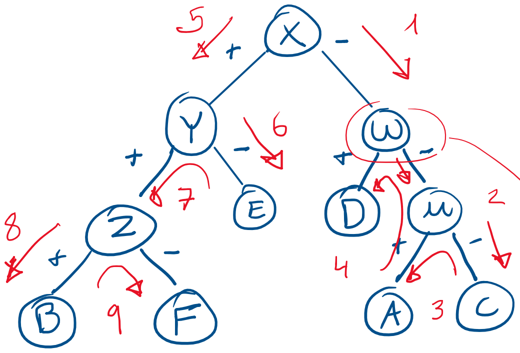
c) $\begin{bmatrix} 4 & 0 & 0 & 0 \\ 0 & 4 & 0 & 0 \\ 0 & 0 & 4 & 0 \\ 0 & 0 & 0 & 1 \end{bmatrix} \times \begin{bmatrix} \cdots \end{bmatrix}$

4



(Acho que não importam os lados dos sinais)

Binary Space Partition



CAM

• Desenhar primeiro o lado oposto à câmara

De que lado do plano W é que está a câmara
→ (+)
⇒ ir pelo (−) primeiro

1º C
2º A
3º D
4º E
5º B
6º F → 6º elemento a ser desenhado é o que está mais próximo da câmara

• Parte II

5. Método Casteljau

$t = 0.75$

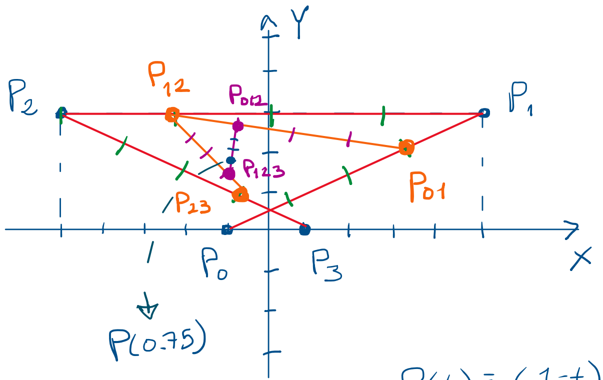
Ponto de uma trajetória cúbica de bezier

$P_0 = (-1, 0)$

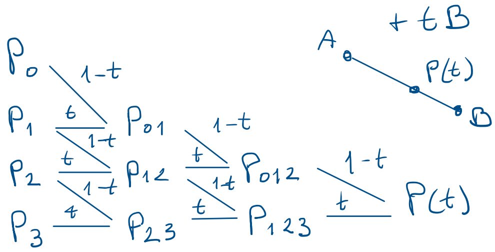
$P_1 = (5, 3)$

$P_2 = (-5, 3)$

$P_3 = (1, 0)$



$P(t) = (1-t)A + tB$



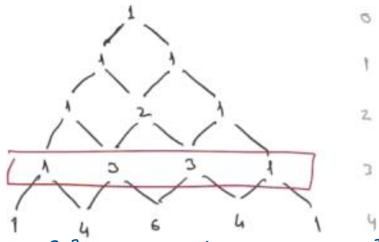
$\Rightarrow P(0.75) = 0.25\,P_{012} + 0.75\,P_{123}$

$= 0.25(0.25\,P_{01} + 0.75\,P_{12}) + 0.75(0.25\,P_{12} + 0.75\,P_{23})$

$= 0.25(0.25(0.25\,P_0 + 0.75\,P_1) + 0.75(0.25\,P_1 + 0.75\,P_2)) +$

$+ 0.75(0.25(0.25\,P_1 + 0.75\,P_2) + 0.75(0.25\,P_2 + 0.75\,P_3))$

$P = (1-t)^3P_1 + 3(1-t)^2tP_2 + 3(1-t)t^2P_3 + t^3P_4$



$P(t) = \underset{0,3}{\boxed{1(1-t)^3}}P_0 + \underset{1,3}{\boxed{3t(1-t)^2}}P_1 + \underset{2,3}{\boxed{3t^2(1-t)}}P_2 + \underset{3,3}{\boxed{1t^3}}P_3$

$t^0(1-t)^{3-0}$ $\quad t^1(1-t)^{3-1}$ $\quad t^i(1-t)^{n-i}$ ...

$0.016\,P_1 + 0.141\,P_2 + 0.422\,P_3 + 0.422\,P_4$

$= (-0.016, 0)$

$+ (0.705, 0.423)$

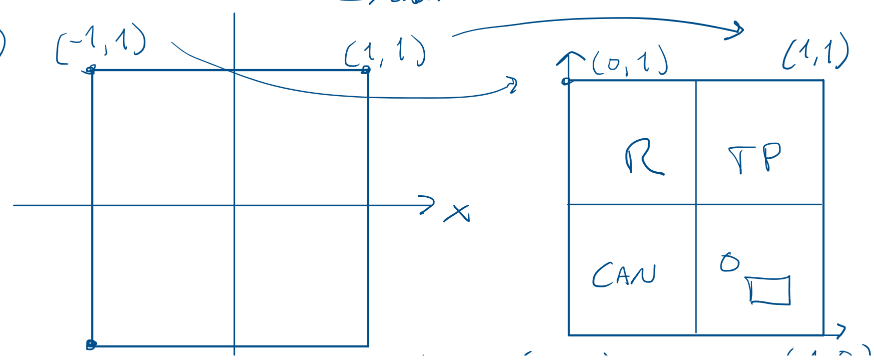
$+ (-2{,}11, 1{,}266)$

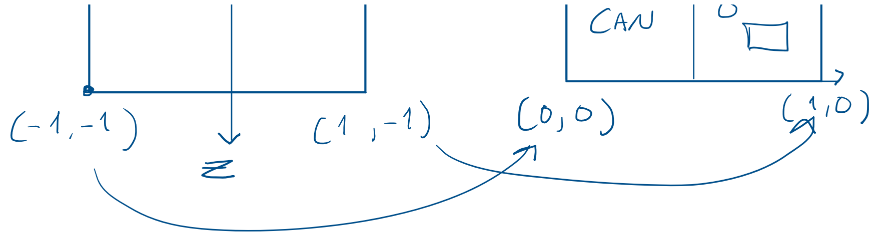
$+ (0{,}422, 0)$

$= (-0{,}999, 1{,}689) \approx (-1, 1.7)$ ✓

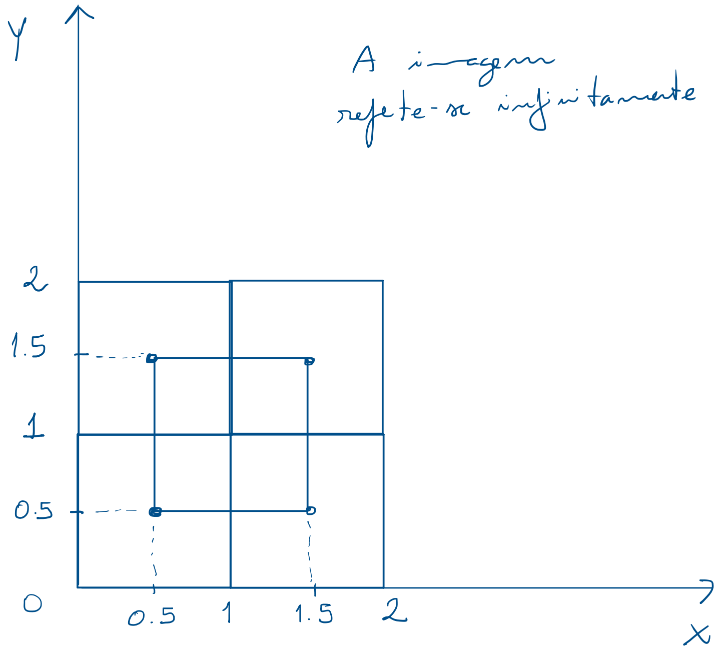
↳ checks out

⑥

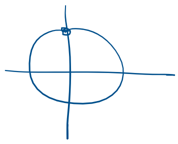


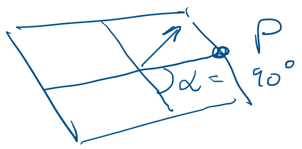


A imagem repete-se infinitamente



(0.5 , 0.5)
(1.5 , 0.5)
(1.5 , 1.5)
(0.5 , 1.5)



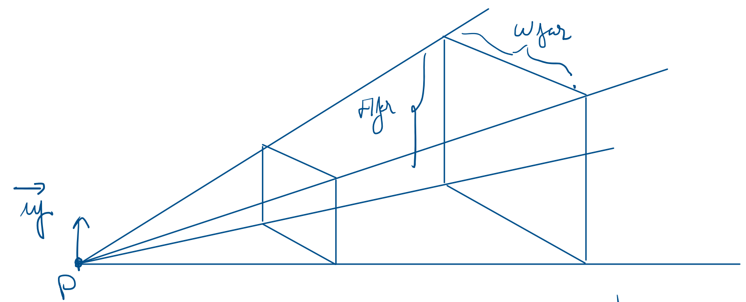


$$\vec{a} \times \vec{b} = |\vec{a}||\vec{b}| \underbrace{\text{sen}(\alpha)}_{=1} \vec{n}$$

$$\Rightarrow \quad n = |P_3 - P_2|\,|P_1 - P_2|$$

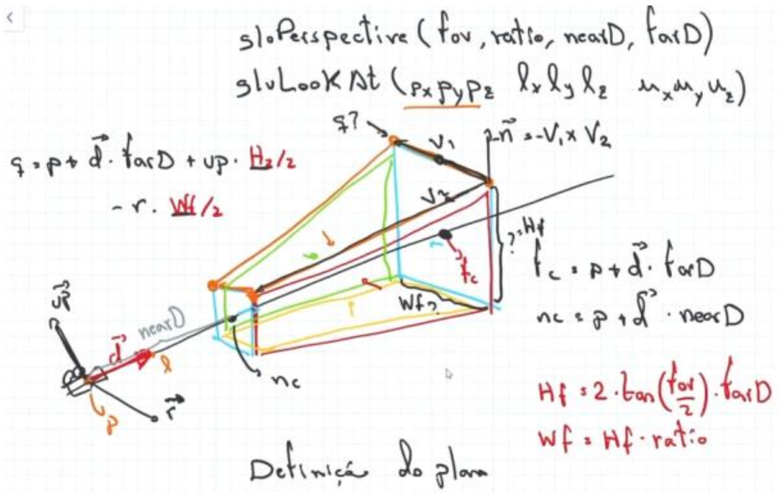
$$\vec{n} = \frac{n}{|n|}$$

8



a) $H_{far} = 2 \cdot \tan\left(\frac{fov}{2}\right) \cdot farDistance$

$W_{far} = H_f \cdot ratio$



b) $\vec{r} = \vec{UP} \times \vec{L}$

$fc = P + \vec{L} \times farD$

$fcd = fc + (-up) \times \frac{H_{far}}{2}$

$fbr = fcd + \vec{r} \times \frac{W_{far}}{2}$