

$$\frac{y^1}{n} = \frac{y_c n}{z_c}$$

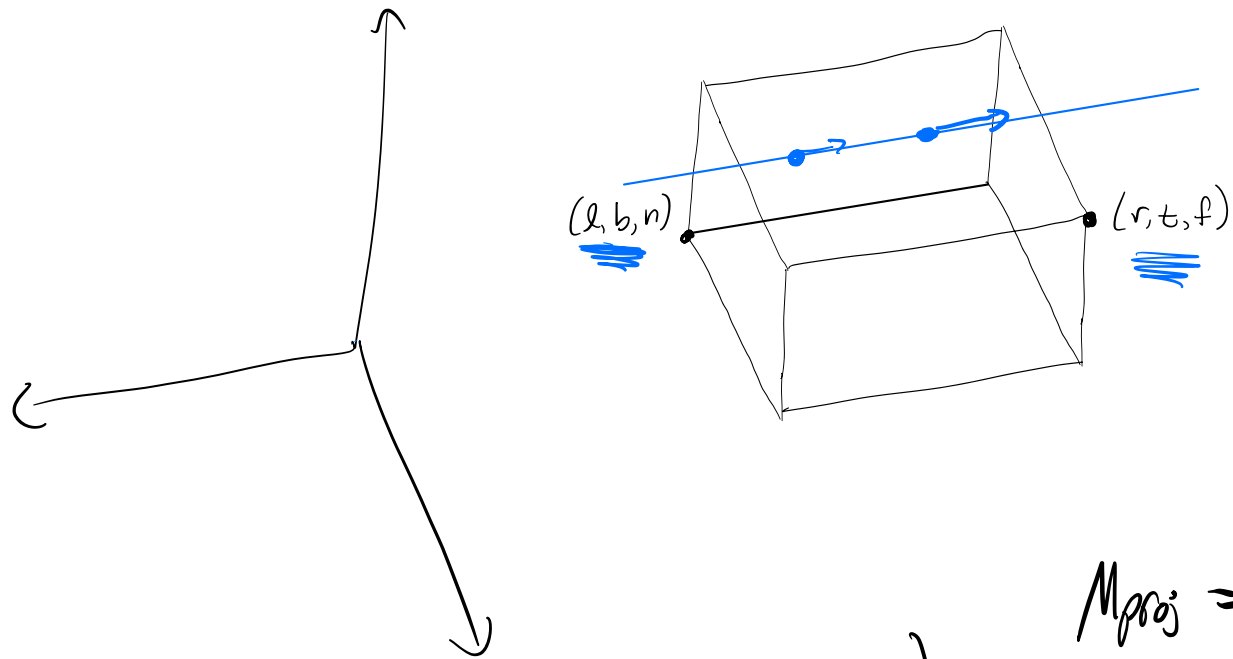
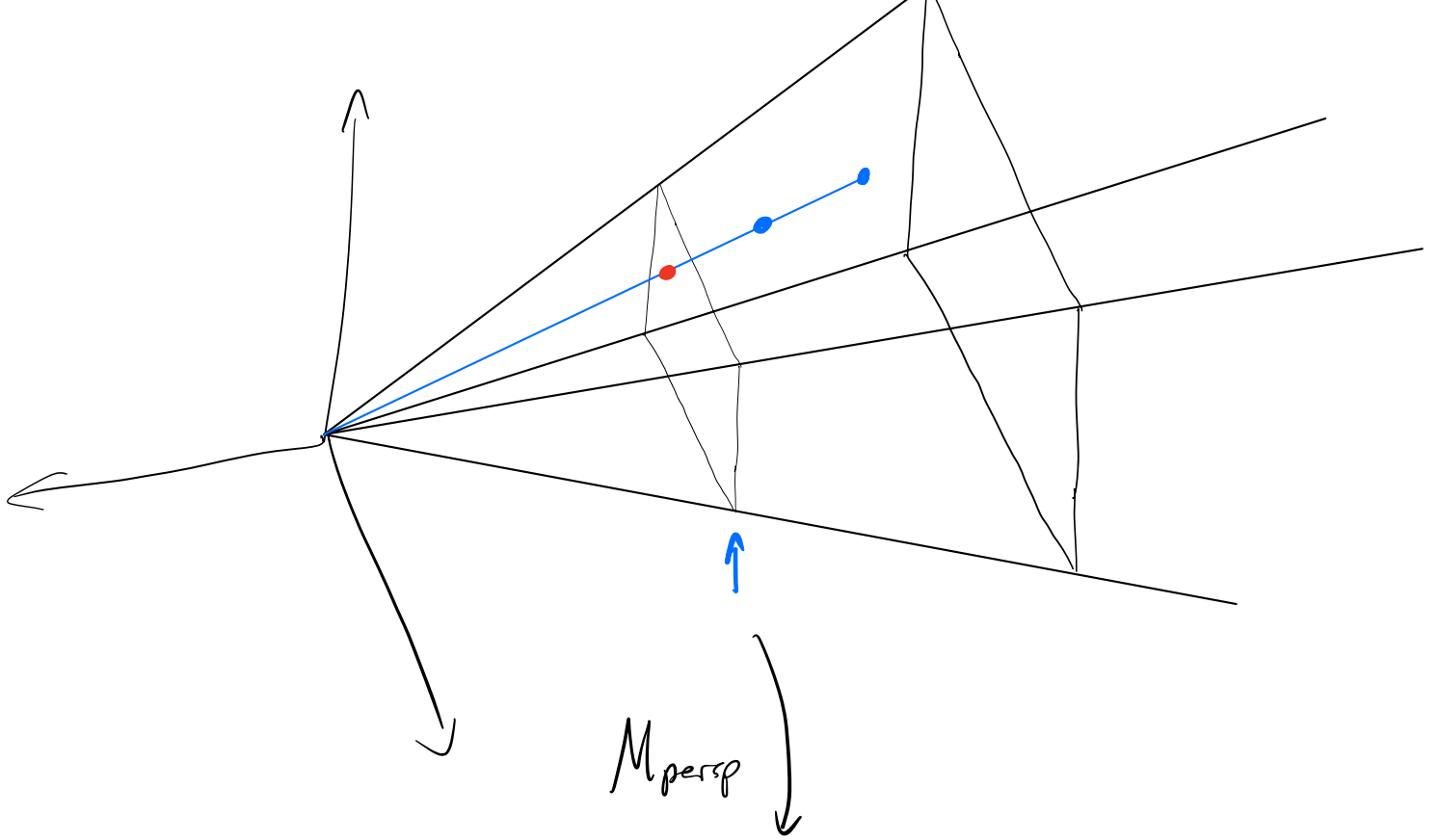
$$x^1 = \frac{x_c n}{z_c}$$

$$\begin{aligned} x^1 &= \frac{n}{z_c} x_c \\ y^1 &= \frac{n}{z_c} y_c \\ z^1 &= ?? \end{aligned}$$

$$\begin{bmatrix} \frac{nx_c}{z_c} \\ \frac{ny_c}{z_c} \\ n+f - \frac{fn}{z_c} \\ 1 \end{bmatrix} \sim \begin{bmatrix} nx_c \\ ny_c \\ z_c(n+f) - fn \\ z_c \end{bmatrix} = \begin{bmatrix} n & 0 & 0 & 0 \\ 0 & n & 0 & 0 \\ 0 & 0 & n+f & -fn \\ 0 & 0 & 1 & 0 \end{bmatrix} \begin{bmatrix} x_c \\ y_c \\ z_c \\ 1 \end{bmatrix}$$

$$z^1 = n+f - \frac{fn}{z_c}$$

(see Desmos plot)



$$M_{\text{proj}} = M_{\text{orth}} M_{\text{persp}}$$

