1. a) $x_1 = f \cdot \frac{p_x}{p_z}$ | $-x_2 = f \cdot \frac{(T - p_x)}{p_z}$

$$d = x_1 - x_2 = f \cdot \frac{p_x}{p_z} + f \cdot \frac{(T - p_x)}{p_z} = \frac{f}{p_z} \cdot (p_x + T - p_x) =$$

$$= \frac{f \cdot T}{p_z}$$

Q_1: $d = (f \cdot T) \cdot \frac{1}{p_z}$

inverse relation

Q_2: object is close to the camera → disparity is large

object is far → disparity is small

1. c) $f = 0{,}25\,cm$

$T = 12\,cm$

$PixNum = 648$

middle pixel $= 648 : 2 = 324$

pix width $= 7{,}4 \cdot 10^{-4}\,cm$

$f \cdot T = 3\,cm^2$

b) $p_z = \frac{f \cdot T}{d}$ $d = x_1 - x_2$

1. $x_1 = 550 - 324 = 226\,pix$

$x_2 = 300 - 324 = -24\,pix$

$d = 250\,pix = 0{,}185\,cm$

$(cm = pix \cdot pix\ width)$

$p_z = \frac{3\,cm^2}{d} = 16{,}216\,cm = 0{,}16216\,m$

2. $x_1 = 226\,pix$

$x_2 = 540 - 324 = 216\,pix$

$d = 10\,pix = 7{,}4 \cdot 10^{-3}\,cm$

$p_z = \frac{3\,cm^2}{d} = 405{,}405\,cm = 4{,}05405\,m$

2. a)

col = 0 = x = u

row = 2 = y = v

1. $x = \begin{bmatrix} 0 \\ 2 \\ 1 \end{bmatrix}$ $Fx = \begin{bmatrix} 0 \\ 1 \\ -1 \end{bmatrix} \Rightarrow y - 1 = 0$

2. $x = u = 1$, $y = v = 0$ $x = \begin{bmatrix} 1 \\ 0 \\ 1 \end{bmatrix}$ $Fx = \begin{bmatrix} 1 \\ 0 \\ -1 \end{bmatrix} \Rightarrow x - 1 = 0$

epipole:

Where they intersect.

$x = 1, y = 1$ $e = \begin{bmatrix} 1 \\ 1 \end{bmatrix}$