Virtual Reality Lab Class: Exercise 5

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5.1

navigation.T = R * inv(intersection.T) * navigation.T

intersection.T^{p} = inv(pointer.WT) * intersection.T

Delta = pointer_cf * inv(pointer_lf)

wheel1_$geom^{s}$ = inv(screen.T) * inv(navigation.T) * cycle_transform.T * wheel1_trans.T * wheel1.geom

5.2

middlePlane = trans(0,1,-2) * scale(4,2,1)

leftPlane = trans(-2,1,0) * rotate(90 , y) * scale(4,2,1)

rightPlane = trans(2,1,0) * rotate(-90 , y) * scale(4,2,1)

5.3

Maximum positive disparity for default eye-distance (6.5 cm):

0.065 m

Horizontal: 41 pixels (rounded down)

Vertical: 46 pixels (rounded down)

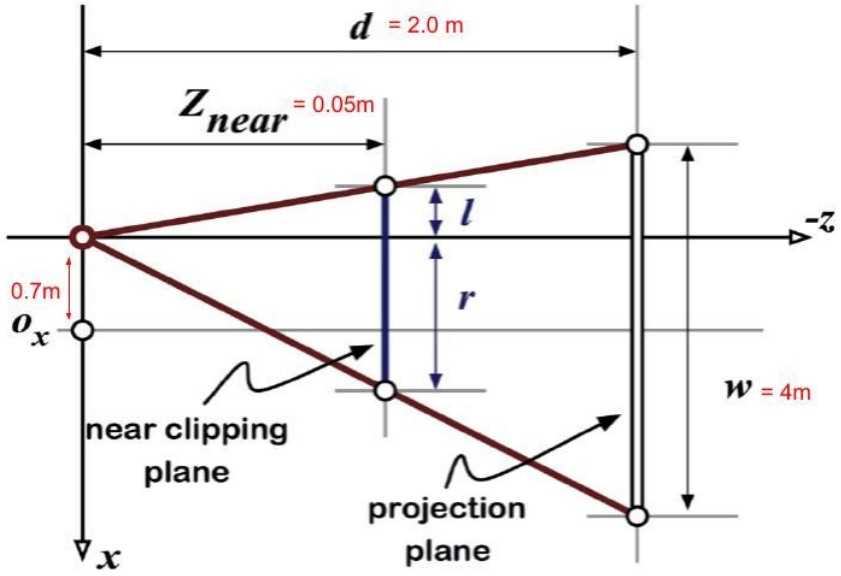
The number of pixels corresponding to maximum disparity differs because pixels are not square.

Therefore maximum number of depth levels is seen when viewing vertically: 46 depth levels.

5.4

$$l = \frac{\left(o_x - \frac{w}{2}\right) z_{near}}{d}$$ = ((0.7 - (4/2)) * 0.05) / 2 = -0.0325 m

$$r = \frac{\left(o_x + \frac{w}{2}\right) z_{near}}{d}$$ = ((0.7 + (4/2)) * 0.05) / 2 = 0.0675 m



$$t = \frac{(Oy - h/2)\, z_{near}}{d}$$ = ((0.75 + (2/2)) * 0.05) / 2 = 0.04375 m

$$b = \frac{(Oy + h/2)\, z_{near}}{d}$$ = ((0.75 - (2/2)) * 0.05) / 2 = -0.00625 m