

## Camera Calibration

RAT

2

```
width height f_x 0.0000000000 c_x 0.0000000000 f_y c_y 0.0000000000 0.0000000000
1.0000000000 k_1 k_2 d_1 d_2 k_3 k_4 k_5 k_6 1.0000000000 0.0000000000
0.0000000000 0.0000000000 1.0000000000 0.0000000000 0.0000000000 0.0000000000
1.0000000000 0.0000000000 0.0000000000 0.0000000000
```

```
width height f_x 0.0000000000 c_x 0.0000000000 f_y c_y 0.0000000000 0.0000000000
1.0000000000 k_1 k_2 d_1 d_2 k_3 k_4 k_5 k_6 0.9997931711 -0.0005164008
-0.0203309690 0.0000223664 0.9997048975 -0.0242923329 0.0203375139 0.0242868538
0.9994981412 -4.6161092267 -0.0325067330 -0.0602950148
```

```
0.0000000000 0.0000000000 0.0000000000 0.0000000000 0.0000000000 0.0000000000
0.0000000000 0.0000000000 0.0000000000 0.0000000000 0.0000000000 0.0000000000
0.0000000000 0.0000000000 0.0000000000 0.0000000000
0.9978235364 -0.0069867675 -70.4441986084 0.0052668755 1.0086277723 -4.3988246918
-0.0000085552 0.0000000000 1.0000000000
1.0301406384 0.0069461912 -3.7452950478 0.0102273207 1.0350575447 -9.7062225342
0.0000152674 0.0000287919 1.0000000000
```

Rotation Matrix

Translation Vector

Inverse Rectification Homography Left (Rectified to Unrectified!)

Inverse Rectification Homography Right (Rectified to Unrectified!)

Formula undistorted point  $p^u$  to distorted  $p^d$ :

$$x = \frac{p_x^u - c_x}{f_x} \quad y = \frac{p_y^u - c_y}{f_y}$$

$$r = \sqrt{x^2 + y^2}$$

RadialComponent

$$RC = \frac{1 + k_1 * r^2 + k_2 * r^4 + k_3 * r^6}{1 + k_4 * r^2 + k_5 * r^4 + k_6 * r^6}$$

TangentialComponent

$$dx = d_1 * (2 * x * y) + d_2 * (r^2 + 2 * x^2)$$

$$dy = d_1 * (r^2 + 2 * y^2) + d_2 * (2 * x * y)$$

Distorted Points

$$p_x^d = f_x * (RC * x + dx) + c_x$$

$$p_y^d = f_y * (RC * y + dy) + c_y$$