

$$\begin{array}{l} W \\ Img = \\ \{I_1, I_2, \ldots, I_m\}mm \\ K_i \\ E_{K_i}W \\ Img \\ P = \\ P_W = \\ \{\mathbf{p}_{1W}, \ldots, \mathbf{p}_{sW}\}j \\ \mathbf{p}_{jW} = \\ (p_{jx}, p_{jy}, p_{jz}, 1) \end{array}$$

$$\begin{array}{l} \mathbf{P}_{jK_{t+1}} = E_{K_{t+1}}W\mathbf{P}_{jW} \\ (1) \quad R^2 \quad R^3 \end{array}$$

$$\begin{array}{l} f(x,y,z,1)=(u_0,v_0)+(x/z,y/z)f_u00f_v\frac{r'}{r} \\ (2) \end{array}$$

$$\begin{array}{l} r=\sqrt{\frac{x^2+y^2}{z^2}} \\ (3) \end{array}$$

$$\begin{array}{l} r'=\frac{1}{\omega}arctan(2rtan\frac{\omega}{2}) \\ (4) \quad f_u,f_v(u_0,v_0)\omega \\ T \end{array}$$

$$\begin{array}{l} E_{K_{t+1}}W = TE_{K_t}W = exp(\mu)E_{K_t}W \\ (5) \quad \mu \\ T \\ (u,v)\mu,T \\ p(\hat{u},\hat{v}) \\ (\hat{u},\hat{v}) \\ \sigma^l = \\ \hat{P}_{t+1} \end{array}$$

$$\begin{array}{l} \mu argmin \sum_{j \in P_{t+1}} \psi(\frac{\mathbf{e}_j}{\sigma_j}, \sigma_T) \\ (6) \end{array}$$

$$\begin{array}{l} \mathbf{e}_j = (\hat{u}_j, \hat{v}_j) - f(exp(\mu)E_{K_t}W\mathbf{P}_{\mathbf{j}}) \\ (7) \quad \psi \end{array}$$

$$\begin{array}{l} \psi(x,c)=\{ \, x \, (1-\frac{x^2}{c^2}) for |x|<c 0 for |x|>c \\ (8) \end{array}$$

$$\begin{array}{l} \{\mu\},\{\mathbf{p}\} argmin = \sum_{i=1}^N \sum_{j \in P_i} \psi(\frac{\mathbf{e}_j}{\sigma_j}, \sigma_T) \\ (9) \end{array}$$