continued from the previous page

13: $\hat{z}_t^k = \begin{pmatrix} \sqrt{q_k} \\ \text{atan2}(\delta_{k,y}, \delta_{k,x}) - \bar{\mu}_{t,\theta} \\ \bar{\mu}_{k,s} \end{pmatrix}$

14: $F_{x,k} = \begin{pmatrix} 1 & 0 & 0 & 0 \cdots 0 & 0 & 0 & 0 & 0 \cdots 0 \\ 0 & 1 & 0 & 0 \cdots 0 & 0 & 0 & 0 & 0 \cdots 0 \\ 0 & 0 & 1 & 0 \cdots 0 & 0 & 0 & 0 & 0 \cdots 0 \\ 0 & 0 & 0 & 0 \cdots 0 & 1 & 0 & 0 & 0 \cdots 0 \\ 0 & 0 & 0 & 0 \cdots 0 & 0 & 1 & 0 & 0 \cdots 0 \\ 0 & 0 & 0 & 0 \cdots 0 & 0 & 0 & 1 & 0 \cdots 0 \end{pmatrix}$

15: $H_t^k = \frac{1}{q_k} \begin{pmatrix} -\sqrt{q}_k \delta_{k,x} & -\sqrt{q}_k \delta_{k,y} & 0 & \sqrt{q}_k \delta_{k,x} & \sqrt{q}_k \delta_{k,y} & 0 \\ \delta_{k,y} & -\delta_{k,x} & -q_k & -\delta_{k,y} & \delta_{k,x} & 0 \\ 0 & 0 & 0 & 0 & 0 & q_k \end{pmatrix} F_{x,k}$

16: $\Psi_k = H_t^k \, \bar{\Sigma}_t \, [H_t^k]^T + Q_t$

17: $\pi_k = (z_t^i - \hat{z}_t^k)^T \, \Psi_k^{-1} \, (z_t^i - \hat{z}_t^k)$

18: *endfor*

19: $\pi_{N_t+1} = \alpha$

20: $j(i) = \underset{k}{\text{argmin}} \; \pi_k$

21: $N_t = \max\{N_t, j(i)\}$

22: $K_t^i = \bar{\Sigma}_t \, [H_t^{j(i)}]^T \Psi_{j(i)}^{-1}$

23: $\bar{\mu}_t = \bar{\mu}_t + K_t^i \, (z_t^i - \hat{z}_t^{j(i)})$

24: $\bar{\Sigma}_t = (I - K_t^i \, H_t^{j(i)}) \, \bar{\Sigma}_t$

25: *endfor*

26: $\mu_t = \bar{\mu}_t$

27: $\Sigma_t = \bar{\Sigma}_t$

28: *return* μ_t, Σ_t

Table 10.2 The EKF SLAM algorithm with ML correspondences, shown here with outlier rejection.