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1: Algorithm FastSLAM 1.0_known_correspondence( $z_t, c_t, u_t, Y_{t-1}$ ):
2:   for  $k = 1$  to  $M$  do // loop over all particles
3:     retrieve  $\langle x_{t-1}^{[k]}, \langle \mu_{1,t-1}^{[k]}, \Sigma_{1,t-1}^{[k]} \rangle, \dots, \langle \mu_{N,t-1}^{[k]}, \Sigma_{N,t-1}^{[k]} \rangle \rangle$  from  $Y_{t-1}$ 
4:      $x_t^{[k]} \sim p(x_t | x_{t-1}^{[k]}, u_t)$  // sample pose
5:      $j = c_t$  // observed feature
6:     if feature  $j$  never seen before
7:        $\mu_{j,t}^{[k]} = h^{-1}(z_t, x_t^{[k]})$  // initialize mean
8:        $H = h'(\mu_{j,t}^{[k]}, x_t^{[k]})$  // calculate Jacobian
9:        $\Sigma_{j,t}^{[k]} = H^{-1} Q_t (H^{-1})^T$  // initialize covariance
10:       $w^{[k]} = p_0$  // default importance weight
11:    else
12:       $\hat{z} = h(\mu_{j,t-1}^{[k]}, x_t^{[k]})$  // measurement prediction
13:       $H = h'(\mu_{j,t-1}^{[k]}, x_t^{[k]})$  // calculate Jacobian
14:       $Q = H \Sigma_{j,t-1}^{[k]} H^T + Q_t$  // measurement covariance
15:       $K = \Sigma_{j,t-1}^{[k]} H^T Q^{-1}$  // calculate Kalman gain
16:       $\mu_{j,t}^{[k]} = \mu_{j,t-1}^{[k]} + K(z_t - \hat{z})$  // update mean
17:       $\Sigma_{j,t}^{[k]} = (I - K H) \Sigma_{j,t-1}^{[k]}$  // update covariance
18:       $w^{[k]} = |2\pi Q|^{-\frac{1}{2}} \exp \left\{ -\frac{1}{2} (z_t - \hat{z})^T Q^{-1} (z_t - \hat{z}) \right\}$  // importance factor
19:    endif
20:    for all other features  $j' \neq j$  do // unobserved features
21:       $\mu_{j',t}^{[k]} = \mu_{j',t-1}^{[k]}$  // leave unchanged
22:       $\Sigma_{j',t}^{[k]} = \Sigma_{j',t-1}^{[k]}$ 
23:    endfor
24:  endfor
25:   $Y_t = \emptyset$  // initialize new particle set
26:  do  $M$  times // resample  $M$  particles
27:    draw random  $k$  with probability  $\propto w^{[k]}$  // resample
28:    add  $\langle x_t^{[k]}, \langle \mu_{1,t}^{[k]}, \Sigma_{1,t}^{[k]} \rangle, \dots, \langle \mu_N^{[k]}, \Sigma_N^{[k]} \rangle \rangle$  to  $Y_t$ 
29:  endfor
30:  return  $Y_t$ 

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Table 13.1 FastSLAM 1.0 with known correspondence.