

Particle filter

$t = 3$

Compute weights

$$w_3^{(k)} \propto \frac{p(\mathbf{x}_{1:3}^{(k)} | \mathbf{y}_{1:3}, \theta)}{q(\mathbf{x}_{1:3}^{(k)} | \mathbf{y}_{1:3}, \theta)} = w_2^{(k)} \frac{p(\mathbf{y}_3 | \mathbf{x}_3^{(k)}) p(\mathbf{x}_3^{(k)} | \mathbf{x}_2^{(k)})}{q(\mathbf{x}_3^{(k)} | \mathbf{x}_2^{(k)}, \mathbf{y}_3)}$$

