Particle filter

$$t = 2$$

Compute weights

$$w_2^{(k)} \propto \frac{p\left(\mathbf{x}_{1:2}^{(k)}|\mathbf{y}_{1:2},\theta\right)}{q\left(\mathbf{x}_{1:2}^{(k)}|\mathbf{y}_{1:2},\theta\right)} = w_1^{(k)} \frac{p\left(\mathbf{y}_2|\mathbf{x}_2^{(k)}\right)p\left(\mathbf{x}_2^{(k)}|\mathbf{x}_1^{(k)}\right)}{q\left(\mathbf{x}_2^{(k)}|\mathbf{x}_1^{(k)},\mathbf{y}_2\right)}$$

$\mathbf{x}_1^{(1)}$ $\mathbf{x}_1^{(2)}$ $\mathbf{x}_1^{(3)}$ $\mathbf{x}_1^{(4)}$ $\mathbf{x}_1^{(5)}$

0/5 2/5 2/5 0/5 1/5

$A_1^{(1)} = 2$ $A_1^{(2)} = 3$ $A_1^{(3)} = 5$ $A_1^{(4)} = 3$ $A_1^{(5)} = 2$

$\mathbf{x}_2^{(1)}$ $\mathbf{x}_2^{(2)}$ $\mathbf{x}_2^{(3)}$ $\mathbf{x}_2^{(4)}$ $\mathbf{x}_2^{(5)}$

2 1 0 1 1