Particle filter

$$t = 3$$

Sample 3rd generation using corresponding parents

$$\mathbf{x}_3^{(k)} \sim q(\cdot \mid \mathbf{y}_2, \mathbf{x}_2^{(A_2^{(k)})}, \theta)$$

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

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

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

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

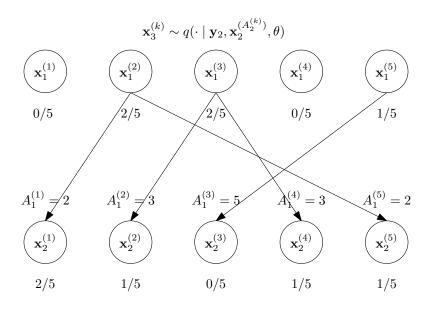2/5   1/5   0/5   1/5   1/5

$A_2^{(1)} = 2$ $A_2^{(2)} = 4$ $A_2^{(3)} = 1$ $A_2^{(4)} = 5$ $A_2^{(5)} = 1$