$$p(\mathbf{x}_{1:n-1}|\mathbf{y}_{1:n-1}) \quad \approx \quad \sum_{\ell=1}^{L} w_{n-1}^{\ell} \delta_{\mathbf{x}_{1:n-1}^{\ell}}(\mathbf{x}_{1:n-1})$$

$$p(\mathbf{x}_{1:n}|y_{1:n}) = g(y_n|\mathbf{x}_{1:n}) f(\mathbf{x}_n|\mathbf{x}_{1:n-1}) p(\mathbf{x}_{1:n-1}|y_{1:n-1})$$

$$q(\mathbf{x}_{1:n}|y_{1:n}) = f(\mathbf{x}_n|\mathbf{x}_{1:n-1}) p(\mathbf{x}_{1:n-1}|y_{1:n-1})$$

$$p(\mathbf{x}_{1:n}|y_{1:n}) \approx \sum_{\ell=1}^{L} g(y_n|\mathbf{x}_{1:n}^{\ell}) \delta_{\mathbf{x}_{1:n}^{\ell}}(\mathbf{x}_{1:n}), \qquad \mathbf{x}_{1:n}^{\ell} = \mathbf{x}_n^{\ell} \mathbf{x}_{1:n-1}^{a_{n-1}^{\ell}} \sim f$$