Inference in a probabilistic program

(trace, weight) = query(program, args, observations)

$\mathbf{x}$ ξ $\mathcal{P}$ α $\mathbf{y}$

$$p(\mathbf{x}; \mathcal{P}, \alpha)$$

$$p(\mathbf{x}|\mathbf{y}; \mathcal{P}, \alpha) \propto p(\mathbf{x}; \mathcal{P}$$

$$q(\mathbf{x}; \mathcal{P}, \alpha, \mathbf{y}) \approx p(\mathbf{x}|\mathbf{y}$$

$$\xi = \frac{p(\mathbf{x}; \mathcal{P}, \alpha)}{q(\mathbf{x}; \mathcal{P}, \alpha, \mathbf{y})} = \frac{\prod_{i \in \mathbf{x} \backslash \mathbf{y}} p(x_i | x_{<i}; \mathcal{P}, \alpha)}{q(\mathbf{x}; \mathcal{P},}$$