initialise $q_{\boldsymbol{\phi}}(\boldsymbol{\theta}|\mathbf{x})$ with K components
initialise proposal prior $\tilde{p}(\boldsymbol{\theta})^{(1)}$ with prior $p(\boldsymbol{\theta})$

repeat

  for $n = 1 \dots N$ **do**
    sample $\boldsymbol{\theta}_n \sim \tilde{p}(\boldsymbol{\theta})^{(r)}$
    sample $\mathbf{x}_n \sim p(\mathbf{x}|\boldsymbol{\theta}_n)$

  (re)train $q_{\boldsymbol{\phi}}(\boldsymbol{\theta}|\mathbf{x})$ with $\mathcal{L}(\boldsymbol{\phi}) = -\frac{1}{N}\sum_n \frac{p(\boldsymbol{\theta}_n)}{\tilde{p}(\boldsymbol{\theta}_n)} \log q_\phi(\boldsymbol{\theta}_n|\mathbf{x}_n)$

  set $\hat{p}(\boldsymbol{\theta}|\mathbf{x} = \mathbf{x}_o)^{(r)} := q_{\boldsymbol{\phi}}(\boldsymbol{\theta}|\mathbf{x}_o)$

  $\tilde{p}(\boldsymbol{\theta})^{(r+1)} \leftarrow \hat{p}(\boldsymbol{\theta}|\mathbf{x} = \mathbf{x}_o)^{(r)}$

until $\hat{p}(\boldsymbol{\theta}|\mathbf{x} = \mathbf{x}_o)$ has converged