

$$Y|X \sim \mathcal{N}(X, \tau^2)$$

$$f(x) = \frac{1}{\sqrt{2\pi}\sigma} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$$

change  $x$  to  $y$

||  $\mu$  to  $x$

||  $\sigma^2$  to  $\tau^2$

$$f(y|x) = \frac{1}{\sqrt{2\pi}\tau}$$

$$e^{-\frac{(y-x)^2}{2\tau^2}}$$