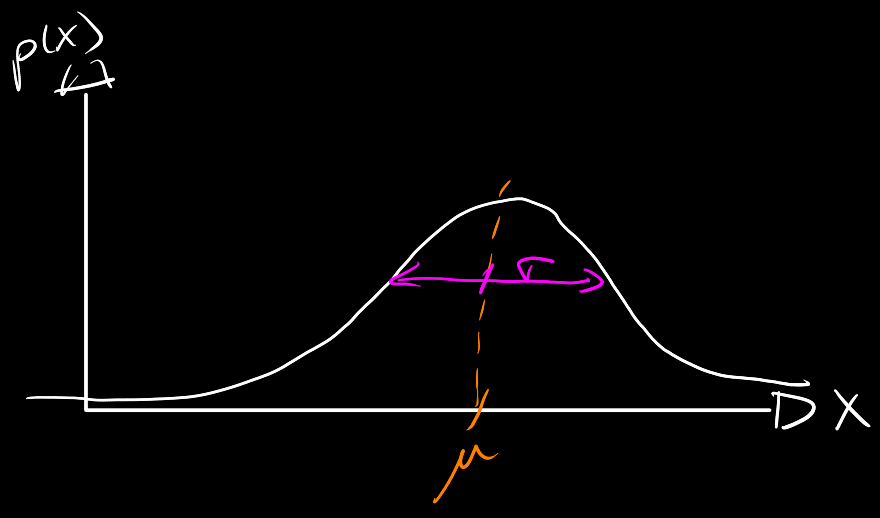
Precision for the Gaussian / Normal



What is the precision τ?

standard deviation

TensorFlow Prob

$$N(x;\mu,\sigma) = \frac{1}{\sigma\sqrt{2\pi}} \exp\left(-\frac{1}{2\sigma^2}(x-\mu)^2\right)$$

Textbooks

variance

$$N(x;\mu,\sigma^2) = \frac{1}{\sqrt{\sigma^2 2\pi}} \exp\left(-\frac{1}{2\sigma^2}(x-\mu)^2\right)$$

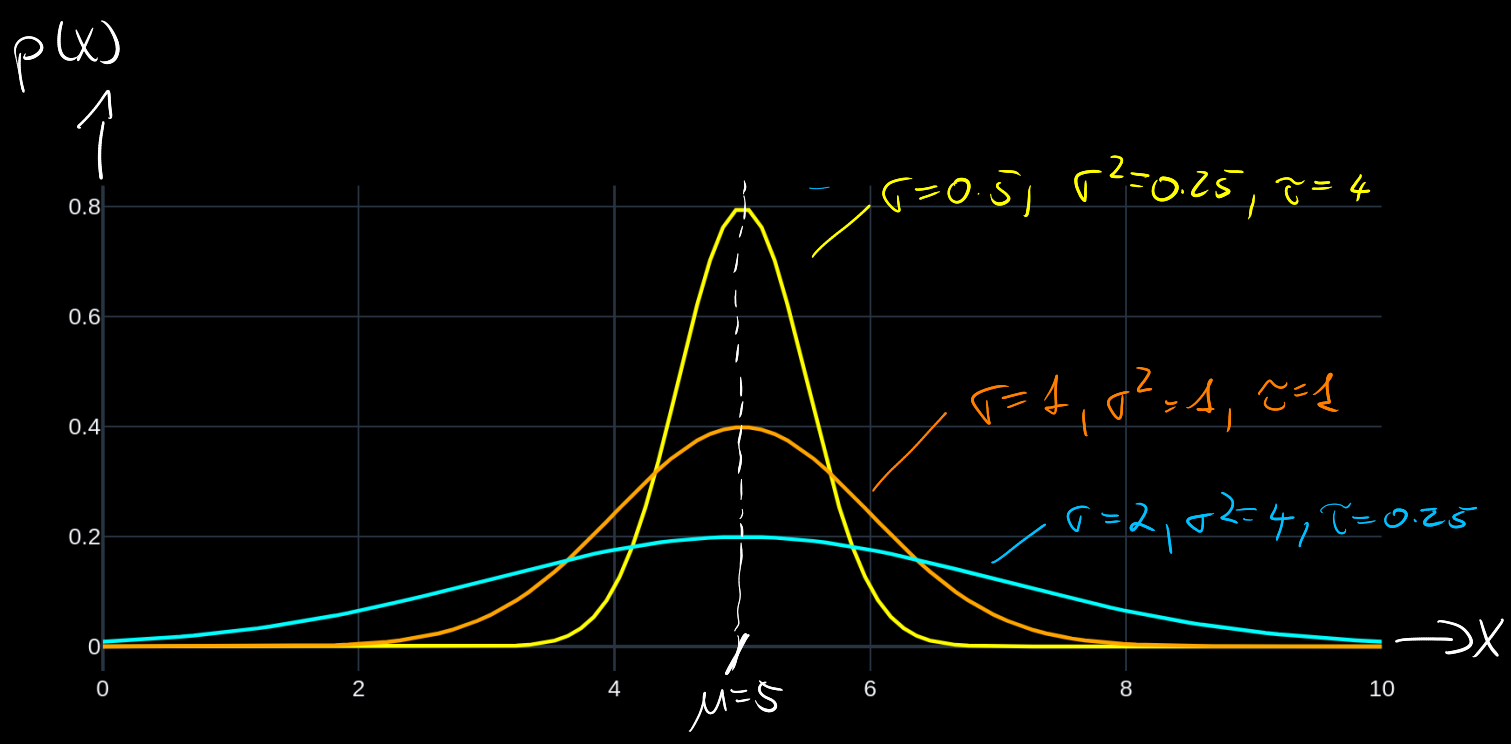
$$N(x;\mu,\tau^{-1}) = \sqrt{\frac{\tau}{2\pi}} \exp\left(-\frac{\tau}{2}(x-\mu)^2\right)$$

$\sigma, \sigma^2, \tau > 0$

$\tau := \frac{1}{\sigma^2}$ inverse of the variance

Why? → Simplifies Bayesian Analyses

because τ is in the numerator



high σ, σ^2 → wider Normal

high τ → narrow Normal

σ, σ^2, τ do not affect the mode/mean