

Gamma prior

$$p(\gamma) = \Gamma(\gamma|a, b) \propto \gamma^{a-1} e^{-b\gamma}$$

$$p(\gamma|x) \propto p(x|\gamma)p(\gamma)$$

$$p(\gamma|x) \propto \left(\gamma^{\frac{1}{2}} e^{-\gamma \frac{(x-\mu)^2}{2}} \right) \cdot \left(\gamma^{a-1} e^{-b\gamma} \right)$$

$$p(\gamma|x) \propto \gamma^{\frac{1}{2} + a - 1} e^{-\gamma(b + \frac{(x-\mu)^2}{2})}$$

