

Week 2 Problems

1. Suppose you have n independent observations that follow a $\text{Poisson}(\lambda)$, so

$$Y_i \sim \text{Poisson}(\lambda) \text{ for } i = 1, 2, \dots, n$$

Using a $\text{Gamma}(\alpha, \beta)$ prior on λ , find the posterior distribution for λ . Does this distribution have a name?

- Poisson PMF: $p(y) = \frac{e^{-\lambda} \lambda^y}{y!}$
- Gamma PDF: $p(y) = \frac{\beta^\alpha}{\Gamma(\alpha)} y^{\alpha-1} e^{-\beta y}$