

HW 5 Problems

Productivity at conference (sampling)

Professor y publishes 3 articles one year

Professor x publishes 6 articles one year

$$y \sim \text{Poisson}(\theta)$$

$$x \sim \text{Poisson}(\theta\gamma)$$

Choose priors

$$\theta \sim \text{Ga}(a, b)$$

$$\gamma \sim \text{Ga}(c, d)$$

“Perfect sampling”:

$$\pi(\theta, \gamma | y, x) \propto \text{Ga}(\gamma; c + x, d) \text{Ga}(\theta; a + x + y, b + 1 + \gamma)$$

Gibbs sampling:

$$\pi(\theta | \gamma, y, x) = \text{Ga}(a + x + y, b + 1 + \gamma)$$

$$\pi(\gamma | \theta, y, x) = \text{Ga}(c + x, d + \theta)$$

To do:

Choose a, b, c, d to not favor one group

Run “perfect” sampling and also run Gibbs sampling

Using both sets of sampling, calculate posterior summaries of the difference in productivity

Compare results from perfect and Gibbs \rightarrow difference at all? Why?

Modify analysis/model to include Professor z who publishes 2 articles