

## Worksheet 20

For each question, compute: (a) joint distribution of the data  $x_i$ , (b) the posterior distribution, and (c) a formula for the Bayes estimator of the unknown parameter.

1. Consider the following for the parameter  $p$ :

$$p \sim \text{Beta}(\alpha, \beta)$$

$$X|p \sim \text{Geometric}(p)$$

2. Consider the following for the parameter  $\mu$ :

$$\mu \sim N(0, 1)$$

$$X|\mu \sim N(\mu, 1)$$

3. Consider the following for the parameter  $\theta$ :

$$\theta \sim F(\alpha, \beta)$$

$$X|\theta \sim U(0, \theta)$$

Where  $F$  is the distribution given by:

$$p(\theta) = \frac{\alpha m^\alpha}{x^{\alpha+1}}, \quad \theta > \beta.$$

This is a generalization of the Pareto. Note that you'll have to calculate the mean of the generalized Pareto as part of your solution.