Math 6480 Bayesian Statistical Inference Fall 2015

HW 3

The first three problems:

Ch2: 8, 9, 10 in the textbook.

4. Let $X_1, \cdots, X_n$ be a random sample from $Gamma(1, \theta)$. The population mean is θ.

(a) Find the expression of the posterior α-quantile of θ.

(b) The prior for θ is $IG(\alpha, \beta)$. Find the Bayesian estimator (rule) of θ under the SEL.

(c) Assume that the Jeffreys prior is used. Find the generalized Bayesian estimator of θ under the SEL.

(d) Find the Bayesian estimator (rule) of θ under loss $L(\theta, a) = (a/\theta - 1)^2$. The prior in (c) is used.

5. Let $X_1, \cdots, X_n$ be a random sample from $Poisson(\theta)$. The prior for θ is $G(\alpha, \beta)$.

(a) Find the Bayesian estimator (rule) of θ under the SEL.

(b) Find the generalized Bayesian estimator (rule) of θ under the loss $L(\theta, a) = (a-\theta)^2/\theta$.