

148. Let $\mathbf{W} = (W_1, \dots, W_n)$ be an IID collection of random variables from a $\text{gamma}(\nu, \theta)$ distribution with known ν and rate θ (that is, the scale is θ^{-1}). For modeling the uncertainty in θ , use a $\text{gamma}(\alpha, \beta)$ prior, where β is the rate.
- (a) Show that the posterior distribution for Bayesian estimation of θ is a gamma with shape parameter $\alpha + n\nu$ and rate parameter $\beta + \sum_{i=1}^n w_i$. You do not need to find an expression for the marginal of \mathbf{W} .
 - (b) Under Bayes rule for absolute error loss, what is the Bayes estimator of θ ? (Provide an explicit expression, not just one word).
 - (c) Under Bayes rule for squared error loss, what is the Bayes estimator of θ ?