Table 4.2.1. *The Bayes estimators of the parameter θ under quadratic loss for conjugate distributions in the usual exponential families.*

Distribution	Conjugate prior	Posterior mean
Normal $\mathcal{N}(\theta, \sigma^2)$	Normal $\mathcal{N}(\mu, \tau^2)$	$\dfrac{\mu\sigma^2 + \tau^2 x}{\sigma^2 + \tau^2}$
Poisson $\mathcal{P}(\theta)$	Gamma $\mathcal{G}(\alpha, \beta)$	$\dfrac{\alpha + x}{\beta + 1}$
Gamma $\mathcal{G}(\nu, \theta)$	Gamma $\mathcal{G}(\alpha, \beta)$	$\dfrac{\alpha + \nu}{\beta + x}$
Binomial $\mathcal{B}(n, \theta)$	Beta $\mathcal{B}e(\alpha, \beta)$	$\dfrac{\alpha + x}{\alpha + \beta + n}$
Negative binomial $\mathcal{N}eg(n, \theta)$	Beta $\mathcal{B}e(\alpha, \beta)$	$\dfrac{\alpha + n}{\alpha + \beta + x + n}$
Multinomial $\mathcal{M}_k(n; \theta_1, \ldots, \theta_k)$	Dirichlet $\mathcal{D}(\alpha_1, \ldots, \alpha_k)$	$\dfrac{\alpha_i + x_i}{\left(\sum_j \alpha_j\right) + n}$
Normal $\mathcal{N}(\mu, 1/\theta)$	Gamma $\mathcal{G}(\alpha/2, \beta/2)$	$\dfrac{\alpha + 1}{\beta + (\mu - x)^2}$