Ex2_BayesianLinearRegression

Solution to exercise 2: Bayesian linear regression

We have the model

$$\begin{aligned} y_i \mid \boldsymbol{\beta} &\sim \mathcal{N}(\boldsymbol{x}_i^T \boldsymbol{\beta}, \phi^{-1}), \quad i = 1, \ldots, n; \\ \boldsymbol{\beta} \mid \kappa &\sim \mathcal{N}(0, \kappa^{-1}\mathrm{I}); \\ \kappa &\sim \mathrm{Gamma}(a_0, b_0); \end{aligned}$$

where $\phi = 1/\sigma^2$ is the precision parameter, which we assume is known, $\boldsymbol{x}_i,\ i = 1, \ldots, n$ are known covariates, $\boldsymbol{\beta} \in \mathbb{R}^p$ includes the intercept, and is unknown, and I is the identity matrix. Assume a_0 and b_0 are known.