Heuristic Prior $\pi(\beta) \sim N_u(\beta_0, \Sigma)$

OLS Classical regression : estimador $\hat{\beta} = (X^TX)^{-1}X^TY \longrightarrow X^TX\beta = X^TY$

$V(\hat{\beta}) = \sigma^2(X^TX)^{-1}$

Posterior dist of $\underset{\sim}{\beta}$ given σ^2 $\sim N_u($ $)$

Univariat:

$$\frac{\frac{n}{\sigma^2}\bar{X} + \frac{1}{\tau_0^2}\mu_0}{\frac{n}{\sigma^2} + \frac{1}{\tau_1^2}} \qquad \frac{\tau^2}{n} = V(\bar{X})$$

$$\left(\left(\sigma^2 X^T X^{-1}\right)^{-1} + \Sigma^{-1}\right)^{-1}\left(\left[\sigma^2(X^TX)^{-1}\right]^{-1}\hat{\beta} + \Sigma^{-1}\beta_0\right) \qquad X^TX\hat{\beta} = X^TY$$

$$= \left[\frac{X^TX}{\sigma^2} + \Sigma^{-1}\right]^{-1}\left[\frac{X^TX}{\sigma^2}\hat{\beta} + \Sigma^{-1}\beta_0\right]$$

$\frac{X^TY}{\sigma^2}$