

Continuous Covariate

Some meta-regressions involve continuous covariates. Under the proposed imputation model, generating imputations of continuous covariates will be a little trickier than generating categorical ones. This is because, given $\eta = (\beta, \tau^2)$, we are generating imputations with a probability model

$$p(X_{mis}|X_{obs}, Y, v, \eta, \psi) \propto p(Y|X, v, \eta)$$

and under the model $-\beta_1 X$ is normally distributed with mean $\beta_0 - Y$ and variance $\tau^2 + v$.

One option is to draw η from its posterior, and then draw $Z \sim N(\beta_0 - Y, \tau^2 + v)$. Then $X = Z / -\beta_1$ would conceivably be a draw from the appropriate distribution.

Alternatively, we could draw a bunch of X from a standard normal distribution, and then resample with probability

$$\frac{p(Y|X, v, \eta)}{\phi(X)}$$