**Blouch SBR1 Model Validation Results - 2023**

04/12/2023

**Multi-regime Validation Results**

**Using simulated data from: SBR1 - Subsample Primate Regime Data Simulations.Rmd**

50 tips, subset of primate tree, standardized to height =1, set.seed(1) – so trees look the same each simulation run

slope<-0.25, hl<-0.01, vY0 <- 4, vX0 <- 0, vy<-0.01, two regimes, c(4.0,4.25)



**Two regime tree**

**1. Direct effect model, one trait, no ME results**

**Priors**

Half-life



10% 50% 75% 90%

0.1139509 0.4003050 0.7631692 1.3754892

**Vy prior distribution**

**Slope and intercept**

Simple one-level regimes model - left:

intercept\_test<-rnorm(100,stan\_sim\_data$ols\_intercept,0.1)

slope\_test<-rnorm(100,stan\_sim\_data$ols\_slope,0.1)

Multilevel model – varying intercepts – right:

beta\_bar<-rnorm(100,stan\_sim\_data$ols\_intercept,0.05)

sd\_beta<-rexp(100,7)

beta<-rnorm(100,beta\_bar,sd\_beta)

slope\_test<-rnorm(100,stan\_sim\_data$ols\_slope,0.05)

 

**1. Simple one-level regimes model**

a. **Direct effect model, one predictor, without ME**

Two divergent transitions

mean se\_mean sd 2.5% 25% 50% 75% 97.5% n\_eff Rhat

hl 0.07 0.00 0.02 0.03 0.06 0.07 0.09 0.12 819 1

beta[1] 3.94 0.00 0.04 3.86 3.91 3.94 3.96 4.02 798 1

beta[2] 4.20 0.00 0.04 4.11 4.18 4.21 4.23 4.29 742 1

beta[3] 0.19 0.00 0.03 0.14 0.17 0.19 0.21 0.25 801 1

vy 0.02 0.00 0.00 0.01 0.01 0.02 0.02 0.02 806 1

Posterior distributions and trank plots





**2. Direct effect model, one trait, with ME results**

**Measurement error setting: M.error<-nrorm(n,0,0.1)**