Bayes R2 LMG implementation

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Implementation of Bayes R^2 using the proposed definitio of Gelman (2017) and the classical definition (which can also be seen as the Kullback-Leibler distance definition). In both R^2 definitions the parameters are sampled from the posteriors. The median of the R^2 posterior distribution is used for the LMG formula and comparison. Doing this sampling for all the possible combinations can then be pretty timeconsuming. Using Inla, the model fitting process is very fast. However, we still have to sample from the posteriors. Using MCMC the posteriors and the R^2 can be built at the same time. However, the MCMC sampling is much more time consuming (than sampling from the INLA posteriors) depending on the sample size and model parameters.

```
library(hier.part);library(INLA); library(brinla); library(xtable); library(rstanarm
```

```
## Loading required package:  gtools
## Loading required package:  sp
## Loading required package:  Matrix
## This is INLA_17.06.20 built 2017-06-20 03:44:36 UTC.
## See www.r-inla.org/contact-us for how to get help.
## Loading required package:  Rcpp
## rstanarm (Version 2.17.2, packaged:  )
## - Do not expect the default priors to remain the same in future
rstanarm versions.
## Thus, R scripts should specify priors explicitly, even if they
are just the defaults.
## - For execution on a local, multicore CPU with excess RAM we
recommend calling
## options(mc.cores = parallel::detectCores())
## - Plotting theme set to bayesplot::theme_default().
```

```
all.regs2 <- function(y, xcan, family = "gaussian", gof = "RMSPE",
                      print.vars = FALSE){
  if(!is.vector(y) && dim(y)[2] != 1)
    cat("\ny must be a vector or a single column data frame")
```

```
pcan <- dim(xcan)[2]
n <- (2^pcan)-1
combs <- combos1(pcan)$ragged
# if(gof != "RMSPE" && gof != "logLik" && gof != "Rsqu" && gof !="Rsqu.glm.bin.o"
{
  #cat("\n gof (goodness of fit measure) must equal")
  # cat("\n \"RMSPE\" (Root-mean-square \"prediction\" error")
  # cat("\n \"logLik\" (Log-Likelihood) or")
  # cat("\n \"Rsqu\" (R-squared)\n\n")
  #}
  #else
  # {
  gfs <- 0 #update
  if(gof == "RMSPE")
    gfs <- sqrt(sum((glm(y ~ 1, family = family)$fitted.values - y)^2))
  if(gof == "logLik")
    gfs <- as.vector(logLik(glm(y ~ 1, family = family)))
  if(gof == "Rsqu")
    gfs <- 0
  #update formula for Rsquared glm
  if(gof == "Rsqu.glm.bin.o" || gof == "Rsqu.glm.bin.l" || gof == "Rsqu.glm.pois.l
    gfs <- 0
  # }
  for(i in 1:n){
    if(i %% 500 == 0)
      cat(i,"regressions calculated:",n-i,"to go...\n")
    current.comb <- as.vector(combs[i,][combs[i,]>0])
    combn <- paste(names(data.frame(xcan)[current.comb]), "", collapse="")
    if(gof == "RMSPE")
      new.line <- current.model(y, current.comb, xcan,
                                family = family, gof = "RMSPE")
    if(gof == "logLik")
      new.line <- current.model(y, current.comb, xcan,
                                family = family, gof = "logLik")
    if(gof == "Rsqu")
      new.line <- current.model(y, current.comb,xcan, gof = "Rsqu")

    if(gof == "Rsqu.glm.bin.o") #update
      new.line <- current.model(y, current.comb,xcan, family=family, gof = "Rsqu.g

    if(gof == "Rsqu.glm.bin.l") #update
      new.line <- current.model(y, current.comb,xcan, family=family, gof = "Rsqu.g
```

```
    if(gof == "Rsqu.glm.pois.l" )
      new.line <- current.model(y, current.comb,xcan, family=family, gof = "Rsqu.g

    if(gof == "Rsqu.glm.pois.v" )
      new.line <- current.model(y, current.comb,xcan, family=family, gof = "Rsqu.g

    if(gof == "Rsqu.glm.pois.sse" )
      new.line <- current.model(y, current.comb,xcan, family=family, gof = "Rsqu.g

    if(gof == "Rsqu.glm.pois.kl" )
      new.line <- current.model(y, current.comb,xcan, family=family, gof = "Rsqu.g

    if(gof == "Rsqu.glm.binom.v" )
      new.line <- current.model(y, current.comb,xcan, family=family, gof = "Rsqu.g

    if(gof == "Rsqu.glm.binom.kl" )
      new.line <- current.model(y, current.comb,xcan, family=family, gof = "Rsqu.g

    if(gof == "Rsqu.glm.binom.sse" )
      new.line <- current.model(y, current.comb,xcan, family=family, gof = "Rsqu.g

    if(gof == "Rsqu.glm.Andrew" )
      new.line <- current.model(y, current.comb,xcan, family=family, gof = "Rsqu.g

    if(gof == "Bayes.KL" )
      new.line <- current.model(y, current.comb,xcan, family=family, gof = "Bayes

    if(gof == "Bayes.Gelman" )
      new.line <- current.model(y, current.comb,xcan, family=family, gof = "Bayes

    if(gof == "Bayes.Snyder" )
      new.line <- current.model(y, current.comb,xcan, family=family, gof = "Bayes

    if(gof == "Bayes.cpo" )
      new.line <- current.model(y, current.comb,xcan, family=family, gof = "Bayes

    if(gof == "Bayes.logL" )
      new.line <- current.model(y, current.comb,xcan, family=family, gof = "Bayes

    gfs <- c(gfs, new.line)
  }
  if(print.vars)
  {
```

```
      cat("regressions done: formatting results\n")
      var.names <- "Theta"
      for(i in 1:n)
      {
        current.comb <- as.vector(combs[i,][combs[i,]>0])
        combn <- paste(names(data.frame(xcan)[current.comb]), "", collapse="")
        new.line <- combn
        var.names <- c(var.names, new.line)
      }
      gfs <- data.frame("variable combination" = var.names, gof = gfs)
    }
    gfs
  }
}

current.model <- function(y, current.comb, xcan, family = "gaussian", gof = "RMSPE")
  {
  comb.data <- data.frame(xcan[,current.comb])
  colnames(comb.data) <- colnames(xcan)[current.comb]
  data <- data.frame(y,comb.data)
  depv <- names(data)[1]
  n.comb <- dim(comb.data)[2]
  xs <- vector("character",n.comb)
  for (i in 1:(n.comb - 1))
    xs[i] <- paste(names(comb.data)[i], "+", sep = "")
  xs[n.comb] <- names(comb.data)[n.comb]
  xss <- paste(xs, collapse = " ", sep = "")
  formu <- formula(paste(depv, "~", xss, sep = ""))
  if(gof == "RMSPE")
    gf <- sqrt(sum((glm(formu, data = data, family = family)$fitted.values - y)^2))
  if(gof == "logLik")
    gf <- as.vector(logLik(glm(formu, data = data, family = family)))
  if(gof == "Rsqu")
    gf <- summary(lm(formu, data = data))$r.squared
  if(gof == "Rsqu.glm.bin.l"){ #update
    mod <- glm(formu, data = data, family = family)
    VarF <- var(as.vector(((model.matrix(mod) %*% coef(mod)))))
    # M=matrix(0, 100000)
    #for (i in 1:100000){
    # M[i]=qlogis(sum(rbinom(length(y), 1,plogis(predict(mod))))/length(y))
    #M[i]=sum(rbinom(length(y), 1,plogis(predict(mod))))/length(y)
    #}
    #VarDS <- pi^2/3
```

```
  VarDS <- 1/(mean(y)*(1-mean(y)))

  gf <- VarF/(VarF + VarDS)}

if(gof == "Rsqu.glm.bin.o"){


  formu <- formula(paste(depv, "~", xss, sep = ""))

  mod <- glm(formu, data = data, family = family)
  VarF <- var(as.vector(plogis((model.matrix(mod) %*% coef(mod)))))
  VarT <- var(y)
  gf <- VarF/VarT}

if(gof == "Rsqu.glm.pois.l"){
  xss<-paste(xss, "+(1|obs)")
  formu <- formula(paste(depv, "~", xss, sep = ""))
  mod <- glmer(formu, data = data, family = family)

  VarDS<-1/mean(y)
  VarF <- var(as.vector(model.matrix(mod) %*% fixef(mod)))
  gf <- VarF/(VarF + VarDS+sum(VarCorr(mod)$obs))

}
if(gof == "Rsqu.glm.pois.kl"){
  mod <- glm(formu, data = data, family = family)

  gf <- rsq(mod,type='kl')

}
if(gof == "Rsqu.glm.pois.v"){
  mod <- glm(formu, data = data, family = poisson(link='log'))

  gf <- rsq(mod, type='v')

}

if(gof == "Rsqu.glm.pois.sse"){
  mod <- glm(formu, data = data, family = poisson(link='log'))

  gf <- rsq(mod, type='sse')

}
```

```
if(gof == "Rsqu.glm.binom.kl"){
  mod <- glm(formu, data = data, family = family)

  gf <- rsq(mod,type='kl')

}
if(gof == "Rsqu.glm.binom.v"){
  mod <- glm(formu, data = data, family = binomial)

  gf <- rsq(mod,type='v')

}

if(gof == "Rsqu.glm.binom.sse"){
  mod <- glm(formu, data = data, family = binomial)

  gf <- rsq(mod,type='sse')

}
if(gof == "Rsqu.glm.Andrew"){
  mod <- glm(formu, data = data, family = family)
  VarF<-var(fitted(mod))
  VarT<-var(fitted(mod))+ var(fitted(mod)-y)

  gf <- VarF/VarT
}

if(gof == "Bayes.KL"){
  mod <- inla(formu, data = data, control.compute = list(dic = TRUE, cpo = TRUE,co

  samples<-inla.posterior.sample(n=1000, mod)
  beta <- matrix(0, nrow = 1000, ncol = (n.comb+1))
  for(i in 1:1000){
    beta[i,] <- samples[[i]]$latent[(nrow(data)+1):(nrow(data)+n.comb+1)]
  }

  yhat <- mod$model.matrix %*% t(beta)

  M=matrix(0, 1000, 1)
  for (i in 1:1000){
    M[i,1]=1-var(y-yhat[,i])/var(y)
  }
```

```
  gf<-median(M)
}

  if(gof == "Bayes.Gelman"){
   mod <- stan_glm(formu, data=data )
   gf<- median(bayes_R2(mod))
  }

if(gof == "Bayes.Snyder"){
  mod <- inla(formu, data = data, control.compute = list(dic = TRUE, cpo = TRUE,co

  samples<-inla.posterior.sample(n=1000, mod)
  beta <- matrix(0, nrow = 1000, ncol = (n.comb+1))
  for(i in 1:1000){
    beta[i,] <- samples[[i]]$latent[(nrow(data)+1):(nrow(data)+n.comb+1)]
  }

  yhat <- mod$model.matrix %*% t(beta)

  M=matrix(0, 1000, 1)
  for (i in 1:1000){
    M[i,1]=var(yhat[,i])/(var(yhat[,i])+(1/samples[[i]]$hyperpar))
  }
  gf <- median(M)

}

  if(gof == "Bayes.cpo"){
  mod <- inla(formu, data = data, control.compute = list(dic = TRUE, cpo = TRUE,co
  LPMLfit<-sum(log(mod$cpo$cpo))
  fit0 <- glm(y ~ 1, family=family, data = data)
  LRT<- -2*(logLik(fit0)-LPMLfit)

   gf <-  1-exp(-LRT/nrow(data))

}

  if(gof == "Bayes.logL"){
  mod <- inla(formu, data = data, control.compute = list(dic = TRUE, cpo = TRUE,co

  fit0 <- glm(y ~ 1, family=family, data = data)

  fitd<- glm(y ~ ., family=family, data = data)
```

```
    samples<-inla.posterior.sample(n=1000, mod)
    beta <- matrix(0, nrow = 1000, ncol = (n.comb+1))
    for(i in 1:1000){
      beta[i,] <- samples[[i]]$latent[(nrow(data)+1):(nrow(data)+n.comb+1)]
    }

    yhat <- mod$model.matrix %*% t(beta)

    M<-matrix(0, 1000,1)

for ( i in 1:1000){

v<-1/samples[[i]]$hyperpar
#logLik1<-sum(dnorm(y, mean=yhat[,i], sd=sqrt(1/samples[[i]]£hyperpar), log=T))
logLik1<-sum(dnorm(y, mean=yhat[,i], sd=sqrt(summary(fitd)$dispersion), log=T))

#logLik1 <- dmvnorm(y, mean=yhat[,i], sigma=diag(nrow(data))*v, log=T)
          LRT<- -2*(logLik(fit0)-logLik1)
      M[i,1]=1-exp(-LRT/nrow(data))
}
    gf <- median(M)

  }

  gf
}

#example data from https://github.com/julianfaraway/brinla

data(usair, package = "brinla")

center_scale <- function(x) {
  scale(x, scale = FALSE)
}


usair.formula1 <-  SO2 ~ negtemp + pop+ manuf + wind + precip  + days
usair.lm1 <- lm(usair.formula1, data = usair)
round(summary(usair.lm1)$r.squared,4)
```

```
[1] 0.6695
```

```
round(summary(usair.lm1)$adj.r.squared,4)
```

[1] 0.6112

```
env1<-data.frame(usair[,2:6])
gof<-all.regs2(usair$SO2, env1, fam = "binomial",
               gof = "Bayes.Gelman", print.vars = TRUE)
```

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 0.000136 seconds 1000 transitions using 10 leapfrog steps per transition would take 1.36 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.077801 seconds (Warm-up) 0.053963 seconds (Sampling) 0.131764 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 1.5e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.15 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.062423 seconds (Warm-up) 0.052376 seconds (Sampling) 0.114799 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 2.5e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.25 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.06709 seconds (Warm-up) 0.060302 seconds (Sampling) 0.127392 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 2e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.2 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.093937 seconds (Warm-up) 0.090183 seconds (Sampling) 0.18412 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.24 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.089582 seconds (Warm-up) 0.066907 seconds (Sampling) 0.156489 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 2.3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.23 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.080755 seconds (Warm-up) 0.057024 seconds (Sampling) 0.137779 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 2e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.2 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.081351 seconds (Warm-up) 0.05675 seconds (Sampling) 0.138101 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 2.1e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.21 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.071568 seconds (Warm-up) 0.05047 seconds (Sampling) 0.122038 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.23 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.071468 seconds (Warm-up) 0.049788 seconds (Sampling) 0.121256 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 1.6e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.16 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.071831 seconds (Warm-up) 0.049173 seconds (Sampling) 0.121004 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 1.2e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.12 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.078244 seconds (Warm-up) 0.052577 seconds (Sampling) 0.130821 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 1.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.14 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.066835 seconds (Warm-up) 0.048243 seconds (Sampling) 0.115078 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.5e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.25 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.076263 seconds (Warm-up) 0.058306 seconds (Sampling) 0.134569 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 1.3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.13 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.073805 seconds (Warm-up) 0.051728 seconds (Sampling) 0.125533 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 2e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.2 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.09869 seconds (Warm-up) 0.050366 seconds (Sampling) 0.149056 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 1.3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.13 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.075714 seconds (Warm-up) 0.05405 seconds (Sampling) 0.129764 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.8e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.28 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.07596 seconds (Warm-up) 0.054794 seconds (Sampling) 0.130754 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 1.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.14 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.079041 seconds (Warm-up) 0.054996 seconds (Sampling) 0.134037 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 1.3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.13 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.070273 seconds (Warm-up) 0.051728 seconds (Sampling) 0.122001 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 1.5e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.15 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.070702 seconds (Warm-up) 0.056227 seconds (Sampling) 0.126929 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.2e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.22 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.070173 seconds (Warm-up) 0.058369 seconds (Sampling) 0.128542 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 1.6e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.16 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.102611 seconds (Warm-up) 0.060272 seconds (Sampling) 0.162883 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 1.7e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.17 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.082475 seconds (Warm-up) 0.058254 seconds (Sampling) 0.140729 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 2.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.24 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.075734 seconds (Warm-up) 0.056759 seconds (Sampling) 0.132493 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 3.7e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.37 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.088523 seconds (Warm-up) 0.0573 seconds (Sampling) 0.145823 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 1.3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.13 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.082422 seconds (Warm-up) 0.058508 seconds (Sampling) 0.14093 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 1.6e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.16 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.06959 seconds (Warm-up) 0.058496 seconds (Sampling) 0.128086 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 1.3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.13 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.0794 seconds (Warm-up) 0.05819 seconds (Sampling) 0.13759 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.2e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.22 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.094504 seconds (Warm-up) 0.056434 seconds (Sampling) 0.150938 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 1.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.14 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.092769 seconds (Warm-up) 0.056734 seconds (Sampling) 0.149503 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 1.6e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.16 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.07928 seconds (Warm-up) 0.058047 seconds (Sampling) 0.137327 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 1.3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.13 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.084343 seconds (Warm-up) 0.057441 seconds (Sampling) 0.141784 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.5e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.25 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.095197 seconds (Warm-up) 0.056638 seconds (Sampling) 0.151835 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 2.2e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.22 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.087036 seconds (Warm-up) 0.069013 seconds (Sampling) 0.156049 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 2e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.2 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.083951 seconds (Warm-up) 0.070634 seconds (Sampling) 0.154585 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 2.3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.23 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.115167 seconds (Warm-up) 0.079193 seconds (Sampling) 0.19436 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 4.1e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.41 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.204506 seconds (Warm-up) 0.1497 seconds (Sampling) 0.354206 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 1.8e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.18 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.19978 seconds (Warm-up) 0.158992 seconds (Sampling) 0.358772 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 1.5e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.15 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.211495 seconds (Warm-up) 0.175244 seconds (Sampling) 0.386739 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 1.9e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.19 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.176857 seconds (Warm-up) 0.157683 seconds (Sampling) 0.33454 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.24 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.08463 seconds (Warm-up) 0.057757 seconds (Sampling) 0.142387 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 1.7e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.17 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.075603 seconds (Warm-up) 0.062564 seconds (Sampling) 0.138167 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 1.5e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.15 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.08933 seconds (Warm-up) 0.060272 seconds (Sampling) 0.149602 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.3 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.089381 seconds (Warm-up) 0.061806 seconds (Sampling) 0.151187 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.2e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.22 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.086594 seconds (Warm-up) 0.058958 seconds (Sampling) 0.145552 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 1.7e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.17 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.079975 seconds (Warm-up) 0.054327 seconds (Sampling) 0.134302 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 1.5e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.15 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.076485 seconds (Warm-up) 0.057142 seconds (Sampling) 0.133627 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 1.3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.13 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.082022 seconds (Warm-up) 0.056215 seconds (Sampling) 0.138237 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.6e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.26 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.074936 seconds (Warm-up) 0.055815 seconds (Sampling) 0.130751 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.3 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.083214 seconds (Warm-up) 0.054562 seconds (Sampling) 0.137776 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 1.5e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.15 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.078421 seconds (Warm-up) 0.056894 seconds (Sampling) 0.135315 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 1.6e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.16 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.080965 seconds (Warm-up) 0.052495 seconds (Sampling) 0.13346 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.24 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.085922 seconds (Warm-up) 0.054912 seconds (Sampling) 0.140834 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 1.8e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.18 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.088708 seconds (Warm-up) 0.060611 seconds (Sampling) 0.149319 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 2.3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.23 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.093565 seconds (Warm-up) 0.058292 seconds (Sampling) 0.151857 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 2.2e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.22 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.083793 seconds (Warm-up) 0.066671 seconds (Sampling) 0.150464 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.23 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.074359 seconds (Warm-up) 0.053671 seconds (Sampling) 0.12803 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 1.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.14 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.082048 seconds (Warm-up) 0.053854 seconds (Sampling) 0.135902 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 2.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.24 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.070904 seconds (Warm-up) 0.085046 seconds (Sampling) 0.15595 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 1.7e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.17 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.076113 seconds (Warm-up) 0.056248 seconds (Sampling) 0.132361 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.2e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.22 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.199182 seconds (Warm-up) 0.176431 seconds (Sampling) 0.375613 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 1.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.14 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.192368 seconds (Warm-up) 0.195451 seconds (Sampling) 0.387819 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 1.3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.13 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.206792 seconds (Warm-up) 0.18464 seconds (Sampling) 0.391432 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 1.5e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.15 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.182956 seconds (Warm-up) 0.166251 seconds (Sampling) 0.349207 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.2e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.22 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.078407 seconds (Warm-up) 0.057828 seconds (Sampling) 0.136235 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 3.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.34 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.08119 seconds (Warm-up) 0.060559 seconds (Sampling) 0.141749 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.3 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.089178 seconds (Warm-up) 0.059077 seconds (Sampling) 0.148255 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 1.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.14 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.093027 seconds (Warm-up) 0.070762 seconds (Sampling) 0.163789 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.1e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.21 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.080477 seconds (Warm-up) 0.06293 seconds (Sampling) 0.143407 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 1.5e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.15 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.077646 seconds (Warm-up) 0.059474 seconds (Sampling) 0.13712 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 1.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.14 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.0789 seconds (Warm-up) 0.061735 seconds (Sampling) 0.140635 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 1.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.14 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.081107 seconds (Warm-up) 0.073704 seconds (Sampling) 0.154811 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.23 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.084588 seconds (Warm-up) 0.062801 seconds (Sampling) 0.147389 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 2.3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.23 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.081157 seconds (Warm-up) 0.07048 seconds (Sampling) 0.151637 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 4.7e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.47 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.091354 seconds (Warm-up) 0.063837 seconds (Sampling) 0.155191 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 1.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.14 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.081084 seconds (Warm-up) 0.057981 seconds (Sampling) 0.139065 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 3.1e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.31 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.222184 seconds (Warm-up) 0.090939 seconds (Sampling) 0.313123 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 1.9e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.19 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.093584 seconds (Warm-up) 0.066778 seconds (Sampling) 0.160362 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 1.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.14 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.085369 seconds (Warm-up) 0.05765 seconds (Sampling) 0.143019 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 1.5e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.15 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.095199 seconds (Warm-up) 0.063032 seconds (Sampling) 0.158231 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.2e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.22 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.094587 seconds (Warm-up) 0.06271 seconds (Sampling) 0.157297 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 1.5e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.15 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.085385 seconds (Warm-up) 0.072824 seconds (Sampling) 0.158209 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 1.8e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.18 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.086497 seconds (Warm-up) 0.061431 seconds (Sampling) 0.147928 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 3.6e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.36 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.098082 seconds (Warm-up) 0.064026 seconds (Sampling) 0.162108 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.2e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.22 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.199675 seconds (Warm-up) 0.160872 seconds (Sampling) 0.360547 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 1.3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.13 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.209494 seconds (Warm-up) 0.169242 seconds (Sampling) 0.378736 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 1.5e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.15 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.155186 seconds (Warm-up) 0.186012 seconds (Sampling) 0.341198 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 2.6e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.26 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.180375 seconds (Warm-up) 0.162624 seconds (Sampling) 0.342999 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.24 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.160393 seconds (Warm-up) 0.158473 seconds (Sampling) 0.318866 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 1.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.14 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.213399 seconds (Warm-up) 0.161696 seconds (Sampling) 0.375095 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 1.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.14 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.200434 seconds (Warm-up) 0.19366 seconds (Sampling) 0.394094 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 1.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.14 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.208475 seconds (Warm-up) 0.204609 seconds (Sampling) 0.413084 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.8e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.28 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.104416 seconds (Warm-up) 0.071573 seconds (Sampling) 0.175989 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 2e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.2 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.098077 seconds (Warm-up) 0.077101 seconds (Sampling) 0.175178 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 1.9e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.19 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.079208 seconds (Warm-up) 0.058019 seconds (Sampling) 0.137227 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 1.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.14 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.082447 seconds (Warm-up) 0.061411 seconds (Sampling) 0.143858 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.2e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.22 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.090215 seconds (Warm-up) 0.076355 seconds (Sampling) 0.16657 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 1.8e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.18 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.080112 seconds (Warm-up) 0.055898 seconds (Sampling) 0.13601 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 1.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.14 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.084856 seconds (Warm-up) 0.067398 seconds (Sampling) 0.152254 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 1.5e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.15 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.078039 seconds (Warm-up) 0.057933 seconds (Sampling) 0.135972 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.2e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.22 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.194137 seconds (Warm-up) 0.200556 seconds (Sampling) 0.394693 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 1.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.14 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.183588 seconds (Warm-up) 0.186114 seconds (Sampling) 0.369702 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 1.2e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.12 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.213103 seconds (Warm-up) 0.143542 seconds (Sampling) 0.356645 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 4.5e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.45 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.185916 seconds (Warm-up) 0.15901 seconds (Sampling) 0.344926 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.23 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.191426 seconds (Warm-up) 0.226315 seconds (Sampling) 0.417741 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 1.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.14 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.206654 seconds (Warm-up) 0.185985 seconds (Sampling) 0.392639 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 1.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.14 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.210132 seconds (Warm-up) 0.187078 seconds (Sampling) 0.39721 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 3.3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.33 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.191485 seconds (Warm-up) 0.126825 seconds (Sampling) 0.31831 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.2e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.22 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.090257 seconds (Warm-up) 0.06666 seconds (Sampling) 0.156917 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 1.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.14 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.091145 seconds (Warm-up) 0.070806 seconds (Sampling) 0.161951 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 1.7e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.17 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.088983 seconds (Warm-up) 0.069221 seconds (Sampling) 0.158204 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 1.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.14 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.084407 seconds (Warm-up) 0.069277 seconds (Sampling) 0.153684 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.23 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.084044 seconds (Warm-up) 0.058525 seconds (Sampling) 0.142569 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 1.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.14 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.087478 seconds (Warm-up) 0.062572 seconds (Sampling) 0.15005 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 1.3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.13 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.093897 seconds (Warm-up) 0.065308 seconds (Sampling) 0.159205 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 1.5e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.15 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.088036 seconds (Warm-up) 0.079554 seconds (Sampling) 0.16759 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.2e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.22 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.175237 seconds (Warm-up) 0.171959 seconds (Sampling) 0.347196 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 1.3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.13 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.176643 seconds (Warm-up) 0.150501 seconds (Sampling) 0.327144 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 1.3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.13 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.193506 seconds (Warm-up) 0.17665 seconds (Sampling) 0.370156 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 1.3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.13 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.183983 seconds (Warm-up) 0.124876 seconds (Sampling) 0.308859 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.1e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.21 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.211015 seconds (Warm-up) 0.196323 seconds (Sampling) 0.407338 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.3 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.233492 seconds (Warm-up) 0.189782 seconds (Sampling) 0.423274 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 1.5e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.15 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.205377 seconds (Warm-up) 0.204164 seconds (Sampling) 0.409541 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 1.9e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.19 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.203396 seconds (Warm-up) 0.175738 seconds (Sampling) 0.379134 seconds (Total)

regressions done: formatting results

```
obj.Gelman<-partition(gof, pcan = 5, var.names = names(usair[,2:6]))


xtable(obj.Gelman$gfs, digits=c(4))
```

```
xtable(obj.Gelman$IJ, digits=c(4))
```

```
xtable(obj.Gelman$I.perc, digits=c(4))
```

```
gof2<-all.regs2(usair$SO2, env1, fam = "binomial",
                gof = "Bayes.KL", print.vars = TRUE)
```

regressions done: formatting results

```
obj2.KL<-partition(gof2, pcan = 5, var.names = names(usair[,2:6]))

xtable(obj2.KL$gfs, digits=c(4))
```

```
xtable(obj2.KL$IJ, digits=c(4))
```

```
xtable(obj2.KL$I.perc, digits=c(4))
```

```
# similar to to Gelman but with error also sampled and INLA used
gof3<-all.regs2(usair$SO2, env1, fam = "binomial",
                gof = "Bayes.Snyder", print.vars = TRUE)
```

regressions done: formatting results

```
obj3.Snyder<-partition(gof3, pcan = 5, var.names = names(usair[,2:6])) # almost sam
```

```
xtable(obj3.Snyder$gfs, digits=c(4))
```

```
xtable(obj3.Snyder$IJ, digits=c(4))
```

```
xtable(obj3.Snyder$I.perc, digits=c(4))
```

The R^2 definitions from Gelman (or Snyder) is pretty close to the R^2 obtained from the maxiumum likelihood estimate. Nevertheless the estimaes and their LMG values do not differ too much.

The R^2_{KL} differs when there are uninformative predictors included in the model. It can then take negative values. However, the R^2_{Gelman}seems then to overestimates the explained variance even more.

	variable.combination	gof
1	Theta	0.0000
2	negtemp	0.1857
3	manuf	0.4142
4	pop	0.2427
5	wind	0.0160
6	precip	0.0134
7	negtemp manuf	0.5155
8	negtemp pop	0.4065
9	negtemp wind	0.2014
10	negtemp precip	0.2531
11	manuf pop	0.5777
12	manuf wind	0.4227
13	manuf precip	0.4229
14	pop wind	0.2531
15	pop precip	0.2604
16	wind precip	0.0440
17	negtemp manuf pop	0.6023
18	negtemp manuf wind	0.5414
19	negtemp manuf precip	0.5590
20	negtemp pop wind	0.4358
21	negtemp pop precip	0.4648
22	negtemp wind precip	0.2718
23	manuf pop wind	0.5797
24	manuf pop precip	0.5799
25	manuf wind precip	0.4271
26	pop wind precip	0.2648
27	negtemp manuf pop wind	0.6195
28	negtemp manuf pop precip	0.6277
29	negtemp manuf wind precip	0.5946
30	negtemp pop wind precip	0.5009
31	manuf pop wind precip	0.5839
32	negtemp manuf pop wind precip	0.6514

	I	J	Total
negtemp	0.1395	0.0462	0.1857
manuf	0.2988	0.1154	0.4142
pop	0.1655	0.0772	0.2427
wind	0.0186	-0.0027	0.0160
precip	0.0289	-0.0155	0.0134

	I
negtemp	21.4218
manuf	45.8688
pop	25.4154
wind	2.8613
precip	4.4328

	variable.combination	gof
1	Theta	0.0000
2	negtemp	0.1794
3	manuf	0.4090
4	pop	0.2346
5	wind	-0.0033
6	precip	-0.0083
7	negtemp manuf	0.4986
8	negtemp pop	0.3852
9	negtemp wind	0.1648
10	negtemp precip	0.2187
11	manuf pop	0.5723
12	manuf wind	0.3974
13	manuf precip	0.4006
14	pop wind	0.2181
15	pop precip	0.2229
16	wind precip	-0.0234
17	negtemp manuf pop	0.5886
18	negtemp manuf wind	0.5171
19	negtemp manuf precip	0.5360
20	negtemp pop wind	0.3947
21	negtemp pop precip	0.4315
22	negtemp wind precip	0.2088
23	manuf pop wind	0.5687
24	manuf pop precip	0.5675
25	manuf wind precip	0.3908
26	pop wind precip	0.2014
27	negtemp manuf pop wind	0.5987
28	negtemp manuf pop precip	0.6081
29	negtemp manuf wind precip	0.5698
30	negtemp pop wind precip	0.4592
31	manuf pop wind precip	0.5646
32	negtemp manuf pop wind precip	0.6282

	I	J	Total
negtemp	0.1354	0.0441	0.1794
manuf	0.3103	0.0988	0.4090
pop	0.1651	0.0695	0.2346
wind	0.0033	-0.0066	-0.0033
precip	0.0141	-0.0225	-0.0083

	I
negtemp	21.5477
manuf	49.3881
pop	26.2827
wind	0.5312
precip	2.2503

	variable.combination	gof
1	Theta	0.0000
2	negtemp	0.1829
3	manuf	0.4115
4	pop	0.2460
5	wind	0.0139
6	precip	0.0120
7	negtemp manuf	0.5228
8	negtemp pop	0.4133
9	negtemp wind	0.2080
10	negtemp precip	0.2560
11	manuf pop	0.5903
12	manuf wind	0.4211
13	manuf precip	0.4317
14	pop wind	0.2483
15	pop precip	0.2515
16	wind precip	0.0419
17	negtemp manuf pop	0.6110
18	negtemp manuf wind	0.5436
19	negtemp manuf precip	0.5651
20	negtemp pop wind	0.4322
21	negtemp pop precip	0.4778
22	negtemp wind precip	0.2749
23	manuf pop wind	0.5913
24	manuf pop precip	0.5877
25	manuf wind precip	0.4343
26	pop wind precip	0.2656
27	negtemp manuf pop wind	0.6219
28	negtemp manuf pop precip	0.6360
29	negtemp manuf wind precip	0.6032
30	negtemp pop wind precip	0.5097
31	manuf pop wind precip	0.5947
32	negtemp manuf pop wind precip	0.6626

	I	J	Total
negtemp	0.1413	0.0416	0.1829
manuf	0.3025	0.1090	0.4115
pop	0.1686	0.0774	0.2460
wind	0.0184	-0.0045	0.0139
precip	0.0319	-0.0199	0.0120

	I
negtemp	21.3169
manuf	45.6538
pop	25.4455
wind	2.7743
precip	4.8095

The following Rcode shows the issues.

```
#add uninformativ predictors
usair$x1<-scale(rnorm(41,0,1))
usair$x2<-scale(rnorm(41,0,1))
usair$x3<-scale(rnorm(41,0,1))

usair.formula1 <-  SO2 ~ days + x1+x2+x3
usair.lm1 <- lm(usair.formula1, data = usair)
round(summary(usair.lm1)$r.squared,4)
```

[1] 0.2303

```
round(summary(usair.lm1)$adj.r.squared,4)
```

[1] 0.1448

```
env1<-data.frame(usair[,7:10])
gof<-all.regs2(usair$SO2, env1, fam = "binomial",
               gof = "Bayes.Gelman", print.vars = TRUE)
```

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.23 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.071846 seconds (Warm-up) 0.051605 seconds (Sampling) 0.123451 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 1.7e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.17 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.076362 seconds (Warm-up) 0.052171 seconds (Sampling) 0.128533 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 1.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.14 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.073456 seconds (Warm-up) 0.049767 seconds (Sampling) 0.123223 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 1.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.14 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.074754 seconds (Warm-up) 0.061736 seconds (Sampling) 0.13649 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.5e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.25 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.074014 seconds (Warm-up) 0.051291 seconds (Sampling) 0.125305 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 1.3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.13 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.069724 seconds (Warm-up) 0.050201 seconds (Sampling) 0.119925 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 1.3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.13 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.078246 seconds (Warm-up) 0.050908 seconds (Sampling) 0.129154 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 1.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.14 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.078765 seconds (Warm-up) 0.055049 seconds (Sampling) 0.133814 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 4.1e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.41 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.072923 seconds (Warm-up) 0.051622 seconds (Sampling) 0.124545 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 1.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.14 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.075928 seconds (Warm-up) 0.050173 seconds (Sampling) 0.126101 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 1.5e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.15 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.078123 seconds (Warm-up) 0.053205 seconds (Sampling) 0.131328 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 1.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.14 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.086646 seconds (Warm-up) 0.052563 seconds (Sampling) 0.139209 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.23 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.073972 seconds (Warm-up) 0.050862 seconds (Sampling) 0.124834 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 2e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.2 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.064649 seconds (Warm-up) 0.05355 seconds (Sampling) 0.118199 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 2.6e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.26 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.077239 seconds (Warm-up) 0.045673 seconds (Sampling) 0.122912 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 1.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.14 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.084132 seconds (Warm-up) 0.052096 seconds (Sampling) 0.136228 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.23 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.077053 seconds (Warm-up) 0.05761 seconds (Sampling) 0.134663 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 1.3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.13 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.072594 seconds (Warm-up) 0.055299 seconds (Sampling) 0.127893 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 1.3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.13 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.08238 seconds (Warm-up) 0.051703 seconds (Sampling) 0.134083 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 3.7e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.37 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.092874 seconds (Warm-up) 0.049615 seconds (Sampling) 0.142489 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.1e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.21 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.078135 seconds (Warm-up) 0.053191 seconds (Sampling) 0.131326 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 1.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.14 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.072496 seconds (Warm-up) 0.055095 seconds (Sampling) 0.127591 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 1.3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.13 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.083487 seconds (Warm-up) 0.052555 seconds (Sampling) 0.136042 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 3.1e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.31 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.07764 seconds (Warm-up) 0.055638 seconds (Sampling) 0.133278 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.2e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.22 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.078961 seconds (Warm-up) 0.057237 seconds (Sampling) 0.136198 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 1.3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.13 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.074375 seconds (Warm-up) 0.056136 seconds (Sampling) 0.130511 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 1.3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.13 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.075967 seconds (Warm-up) 0.051848 seconds (Sampling) 0.127815 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 1.3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.13 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.072274 seconds (Warm-up) 0.054956 seconds (Sampling) 0.12723 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.2e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.22 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.08261 seconds (Warm-up) 0.054665 seconds (Sampling) 0.137275 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 1.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.14 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.071135 seconds (Warm-up) 0.052341 seconds (Sampling) 0.123476 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 3.5e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.35 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.085578 seconds (Warm-up) 0.05318 seconds (Sampling) 0.138758 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 3.5e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.35 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.093903 seconds (Warm-up) 0.05487 seconds (Sampling) 0.148773 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.1e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.21 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.065045 seconds (Warm-up) 0.052791 seconds (Sampling) 0.117836 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 1.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.14 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.079669 seconds (Warm-up) 0.053162 seconds (Sampling) 0.132831 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 3.5e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.35 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.075317 seconds (Warm-up) 0.052693 seconds (Sampling) 0.12801 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 1.5e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.15 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.074256 seconds (Warm-up) 0.052214 seconds (Sampling) 0.12647 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.1e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.21 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.061541 seconds (Warm-up) 0.052824 seconds (Sampling) 0.114365 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 1.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.14 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.074615 seconds (Warm-up) 0.052992 seconds (Sampling) 0.127607 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 1.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.14 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.069391 seconds (Warm-up) 0.054467 seconds (Sampling) 0.123858 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 1.3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.13 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.058579 seconds (Warm-up) 0.055241 seconds (Sampling) 0.11382 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.23 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.0776 seconds (Warm-up) 0.058455 seconds (Sampling) 0.136055 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 1.6e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.16 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.078621 seconds (Warm-up) 0.058109 seconds (Sampling) 0.13673 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 1.6e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.16 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.084534 seconds (Warm-up) 0.058842 seconds (Sampling) 0.143376 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.3 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.071436 seconds (Warm-up) 0.057652 seconds (Sampling) 0.129088 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.1e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.21 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.076866 seconds (Warm-up) 0.055727 seconds (Sampling) 0.132593 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 1.5e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.15 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.087719 seconds (Warm-up) 0.056107 seconds (Sampling) 0.143826 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 1.5e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.15 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.088403 seconds (Warm-up) 0.056738 seconds (Sampling) 0.145141 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 1.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.14 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.0742 seconds (Warm-up) 0.056215 seconds (Sampling) 0.130415 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.2e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.22 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.073979 seconds (Warm-up) 0.054159 seconds (Sampling) 0.128138 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 1.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.14 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.071836 seconds (Warm-up) 0.057875 seconds (Sampling) 0.129711 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 1.3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.13 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.095491 seconds (Warm-up) 0.063483 seconds (Sampling) 0.158974 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 1.3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.13 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.08433 seconds (Warm-up) 0.059429 seconds (Sampling) 0.143759 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.3e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.23 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.079983 seconds (Warm-up) 0.058241 seconds (Sampling) 0.138224 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 1.6e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.16 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.086042 seconds (Warm-up) 0.058845 seconds (Sampling) 0.144887 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 1.5e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.15 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.068291 seconds (Warm-up) 0.058829 seconds (Sampling) 0.12712 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 1.6e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.16 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.076579 seconds (Warm-up) 0.059741 seconds (Sampling) 0.13632 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 1).

Gradient evaluation took 2.1e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.21 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.0848 seconds (Warm-up) 0.058061 seconds (Sampling) 0.142861 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 2).

Gradient evaluation took 1.5e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.15 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.078648 seconds (Warm-up) 0.060891 seconds (Sampling) 0.139539 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 3).

Gradient evaluation took 2.6e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.26 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.091422 seconds (Warm-up) 0.057965 seconds (Sampling) 0.149387 seconds (Total)

SAMPLING FOR MODEL 'continuous' NOW (CHAIN 4).

Gradient evaluation took 1.4e-05 seconds 1000 transitions using 10 leapfrog steps per transition would take 0.14 seconds. Adjust your expectations accordingly!

Iteration: 1 / 2000 [0Iteration: 200 / 2000 [10Iteration: 400 / 2000 [20Iteration: 600 / 2000 [30Iteration: 800 / 2000 [40Iteration: 1000 / 2000 [50Iteration: 1001 / 2000 [50Iteration: 1200 / 2000 [60Iteration: 1400 / 2000 [70Iteration: 1600 / 2000 [80Iteration: 1800 / 2000 [90Iteration: 2000 / 2000 [100

Elapsed Time: 0.083236 seconds (Warm-up) 0.074466 seconds (Sampling) 0.157702 seconds (Total)

regressions done: formatting results

```
obj.Gelman<-partition(gof, pcan = 4, var.names = names(usair[,7:10]))


xtable(obj.Gelman$gfs, digits=c(4))
```

```
xtable(obj.Gelman$IJ, digits=c(4))
```

```
xtable(obj.Gelman$I.perc, digits=c(4))
```

```
gof2<-all.regs2(usair$SO2, env1, fam = "binomial",
                gof = "Bayes.KL", print.vars = TRUE)
```

regressions done: formatting results

```
obj2.KL<-partition(gof2, pcan = 4, var.names = names(usair[,7:10]))
xtable(obj2.KL$gfs, digits=c(4))
```

	variable.combination	gof
1	Theta	0.0000
2	days	0.1324
3	x1	0.0436
4	x2	0.0107
5	x3	0.0158
6	days x1	0.2304
7	days x2	0.1501
8	days x3	0.1518
9	x1 x2	0.0671
10	x1 x3	0.0804
11	x2 x3	0.0388
12	days x1 x2	0.2455
13	days x1 x3	0.2499
14	days x2 x3	0.1700
15	x1 x2 x3	0.1035
16	days x1 x2 x3	0.2581

	I	J	Total
days	0.1502	-0.0178	0.1324
x1	0.0727	-0.0291	0.0436
x2	0.0148	-0.0041	0.0107
x3	0.0204	-0.0047	0.0158

```
xtable(obj2.KL$IJ, digits=c(4))
```

```
xtable(obj2.KL$I.perc, digits=c(4))
```

	I
days	58.1883
x1	28.1677
x2	5.7267
x3	7.9172

	variable.combination	gof
1	Theta	0.0000
2	days	0.1269
3	x1	0.0316
4	x2	-0.0111
5	x3	-0.0022
6	days x1	0.1972
7	days x2	0.1093
8	days x3	0.1085
9	x1 x2	0.0102
10	x1 x3	0.0239
11	x2 x3	-0.0249
12	days x1 x2	0.1768
13	days x1 x3	0.1820
14	days x2 x3	0.0880
15	x1 x2 x3	-0.0033
16	days x1 x2 x3	0.1652

	I	J	Total
days	0.1434	-0.0165	0.1269
x1	0.0505	-0.0190	0.0316
x2	-0.0178	0.0067	-0.0111
x3	-0.0109	0.0087	-0.0022

	I
days	86.7953
x1	30.5949
x2	-10.7658
x3	-6.6244

The R_{KL} gets worse when uninformativ predictors are added. The more uninformative predictors are added, the more negativ it gets.This somehow makes sense, because the mean of the new data is harder to predict when noise is added. The explained variance for new data seems to be nearer to thruth with the R_{KL}. It may still overestimates it for small samples, because whole data is used and not leave-one-out crossvalidation. The R_{Gelman} on the other gets substantially bigger when uninformativ predictors are added, even more then when we would use maxiumum likelihood estimation. Gelman(2017) note that their R^2 overestimates the explained variance, but that it should overestimate it less than the maxiumum likelihood estimation. Another disadvantage is that it no longer can be seen as a fit to a fixed target. This may be problematic for the LMG formula. A benefit is that prior information can be included in the model if needed, especially when the variance is also sampled from the posterior. I think in general the R_{KL} may be a more useful measure for the LMG formula. The Question is also how realistic these completely uninformativ predictors are in praxis. The negative R^2 could be used to discard uninformative predictors in the first step. We would only use the predictors where the LMG value is positiv. The others can safely be discarded. The formula should then give a reasonable R^2 prediction for new data and its corresponding variable importance.

```
env1<-data.frame(usair[,2:6])

gof4<-all.regs2(usair$SO2, env1, fam = "gaussian",
                gof = "Bayes.logL", print.vars = TRUE)
```

regressions done: formatting results

```
obj4<-partition(gof4, pcan = 5, var.names = names(usair[,2:6]))
xtable(obj4$gfs, digits=c(4))
```

```
xtable(obj4KL$IJ, digits=c(4))

## Error in xtable(obj4KL$IJ, digits = c(4)):  Objekt 'obj4KL' nicht
gefunden

xtable(obj4$I.perc, digits=c(4))
```

```
#gof4<-all.regs2(usair£SO2, env1, fam = "gaussian",
           #     gof = "Bayes.logL", print.vars = TRUE)

#obj4<-partition(gof4, pcan = , var.names = names(usair[,2:6]))
```

	variable.combination	gof
1	Theta	0.0000
2	negtemp	0.1627
3	manuf	0.3951
4	pop	0.2206
5	wind	-0.0273
6	precip	-0.0304
7	negtemp manuf	0.4878
8	negtemp pop	0.3739
9	negtemp wind	0.1428
10	negtemp precip	0.2030
11	manuf pop	0.5596
12	manuf wind	0.3825
13	manuf precip	0.3867
14	pop wind	0.1981
15	pop precip	0.2014
16	wind precip	-0.0506
17	negtemp manuf pop	0.5779
18	negtemp manuf wind	0.5054
19	negtemp manuf precip	0.5236
20	negtemp pop wind	0.3804
21	negtemp pop precip	0.4198
22	negtemp wind precip	0.1877
23	manuf pop wind	0.5568
24	manuf pop precip	0.5574
25	manuf wind precip	0.3775
26	pop wind precip	0.1831
27	negtemp manuf pop wind	0.5896
28	negtemp manuf pop precip	0.5975
29	negtemp manuf wind precip	0.5564
30	negtemp pop wind precip	0.4460
31	manuf pop wind precip	0.5536
32	negtemp manuf pop wind precip	0.6205

	I
negtemp	21.7066
manuf	50.3523
pop	26.6972
wind	-0.3196
precip	1.5635