gaussian_measurement_model_stan

prelims

```
rm(list=ls())
set.seed(123)

setwd("~/Desktop")

library(rstan)
```

```
## Loading required package: StanHeaders
```

```
## Loading required package: ggplot2
```

```
## rstan (Version 2.21.2, GitRev: 2e1f913d3ca3)
```

```
## For execution on a local, multicore CPU with excess RAM we recommend calling
## options(mc.cores = parallel::detectCores()).
## To avoid recompilation of unchanged Stan programs, we recommend calling
## rstan_options(auto_write = TRUE)
```

```
#library(ggplot2)
options(mc.cores = parallel::detectCores())
```

set simulation params

```
nObs = 100
muTrue = 3
sigmaTrue = 0.2
```

simulate data

```
y = rnorm(nObs, muTrue, sigmaTrue)
```

fit model in Stan

```
fit = stan('gaussian_measurement_model.stan', iter = 1000, chains = 4,
           data = list(y=y, N = nObs))
```

```
## Trying to compile a simple C file
```

```
## Running /Library/Frameworks/R.framework/Resources/bin/R CMD SHLIB foo.c
## clang -I"/Library/Frameworks/R.framework/Resources/include" -DNDEBUG   -I"/Users/antonio/Library/R/4
## In file included from <built-in>:1:
## In file included from /Users/antonio/Library/R/4.0/library/StanHeaders/include/stan/math/prim/mat/fu
```

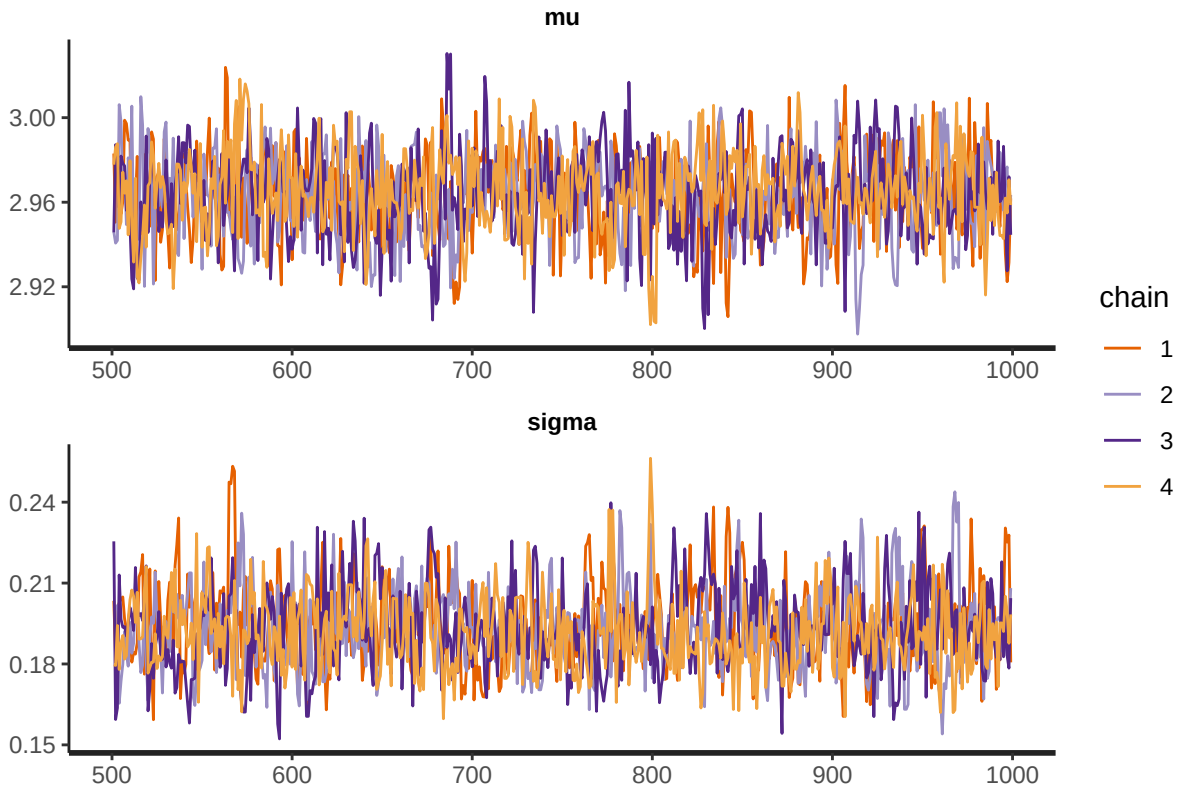
```
## In file included from /Users/antonio/Library/R/4.0/library/RcppEigen/include/Eigen/Dense:1:
## In file included from /Users/antonio/Library/R/4.0/library/RcppEigen/include/Eigen/Core:88:
## /Users/antonio/Library/R/4.0/library/RcppEigen/include/Eigen/src/Core/util/Macros.h:628:1: error: unl
## namespace Eigen {
## ^
## /Users/antonio/Library/R/4.0/library/RcppEigen/include/Eigen/src/Core/util/Macros.h:628:16: error: ex
## namespace Eigen {
##                ^
##                ;
## In file included from <built-in>:1:
## In file included from /Users/antonio/Library/R/4.0/library/StanHeaders/include/stan/math/prim/mat/fu
## In file included from /Users/antonio/Library/R/4.0/library/RcppEigen/include/Eigen/Dense:1:
## /Users/antonio/Library/R/4.0/library/RcppEigen/include/Eigen/Core:96:10: fatal error: 'complex' file
## #include <complex>
##          ^~~~~~~~
## 3 errors generated.
## make: *** [foo.o] Error 1
```

print fits and diagnostics

```
print(fit,probs = c(0.25,0.5,0.75))
```

```
## Inference for Stan model: gaussian_measurement_model.
## 4 chains, each with iter=1000; warmup=500; thin=1;
## post-warmup draws per chain=500, total post-warmup draws=2000.
##
##       mean se_mean   sd  25%  50%  75% n_eff Rhat
## mu    2.96    0.00 0.02 2.95 2.96 2.98   997    1
## sigma 0.19    0.00 0.02 0.18 0.19 0.20   876    1
## lp__  6.34    0.03 0.94 5.97 6.65 7.01   755    1
##
## Samples were drawn using NUTS(diag_e) at Wed Feb 17 17:22:51 2021.
## For each parameter, n_eff is a crude measure of effective sample size,
## and Rhat is the potential scale reduction factor on split chains (at
## convergence, Rhat=1).
```

```
traceplot(fit, inc_warmup = FALSE, nrow = 2)
```



visualize posteriors

```
pairs(fit, pars = c("mu", "sigma", "lp__"))
```