# Homework

https://github.com/clobos/Seminario_STAN_UFBA

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Section 1

# Homework

# Beta(1,1)+Binomial(N=10,$\theta$): Stan Code

```
beta_binomial1<-
'data {
  int<lower=0> N;
  int<lower=0> y;
}
parameters {
  real<lower=0,upper=1> theta;
}
model {
  theta ~ beta(1,1);
  y ~ binomial(N,theta);
}
'
```

# Beta(1,1)+Binomial(N=10,$\theta$): Stan Code

```
fit_beta_binomial1 <- stan(model_code = beta_binomial1,
                  data = list(N = 10,y = 7),
                  chain = 3,
                  iter = 11000,
                  warmup = 1000,
                  thin = 10,
                  refresh=0)
#save.image("fit_beta_binomial1_beta_1_1.Rdata")
```

# Summary from the posterior distibution

```
#parameters<- "theta"
CI_theta <- summary(fit_beta_binomial1,
probs = c(0.025, 0.975))$summary
print(round(CI_theta,3))
```

```
        mean se_mean    sd    2.5%  97.5%    n_eff Rhat
theta  0.668   0.002 0.130   0.402  0.891 3084.455    1
lp__  -8.155   0.014 0.709 -10.153 -7.639 2730.368    1
```

# MCMC diagnostics using the bayesplot package

```
traceplot(fit_beta_binomial1, pars = parameters,
          inc_warmup = TRUE)
```

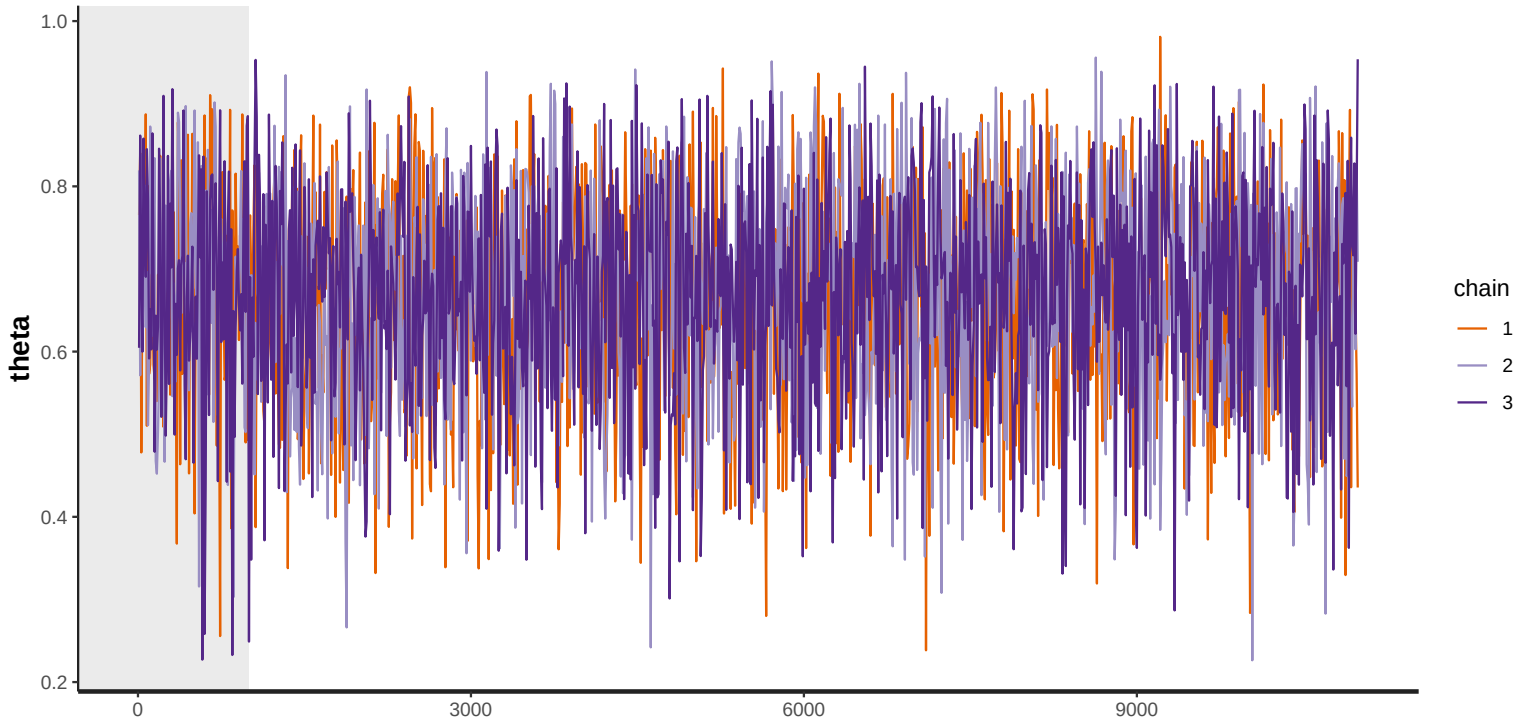



Figure 1: Traceplots for the Beta Binomial example

# MCMC diagnostics using the bayesplot package

```
mcmc_combo(mcmc_chain1,pars = parameters,
           combo = c("hist", "dens"))
```

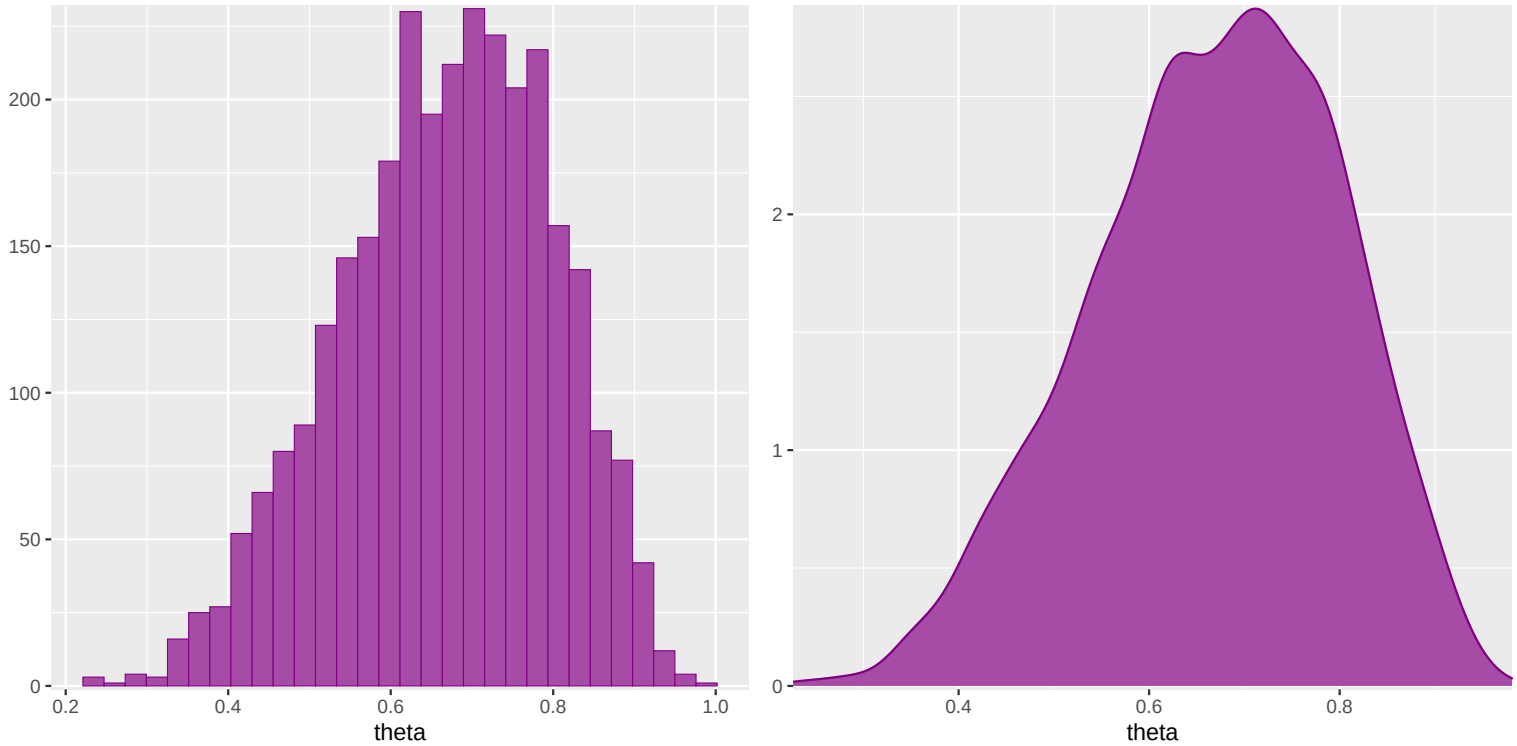
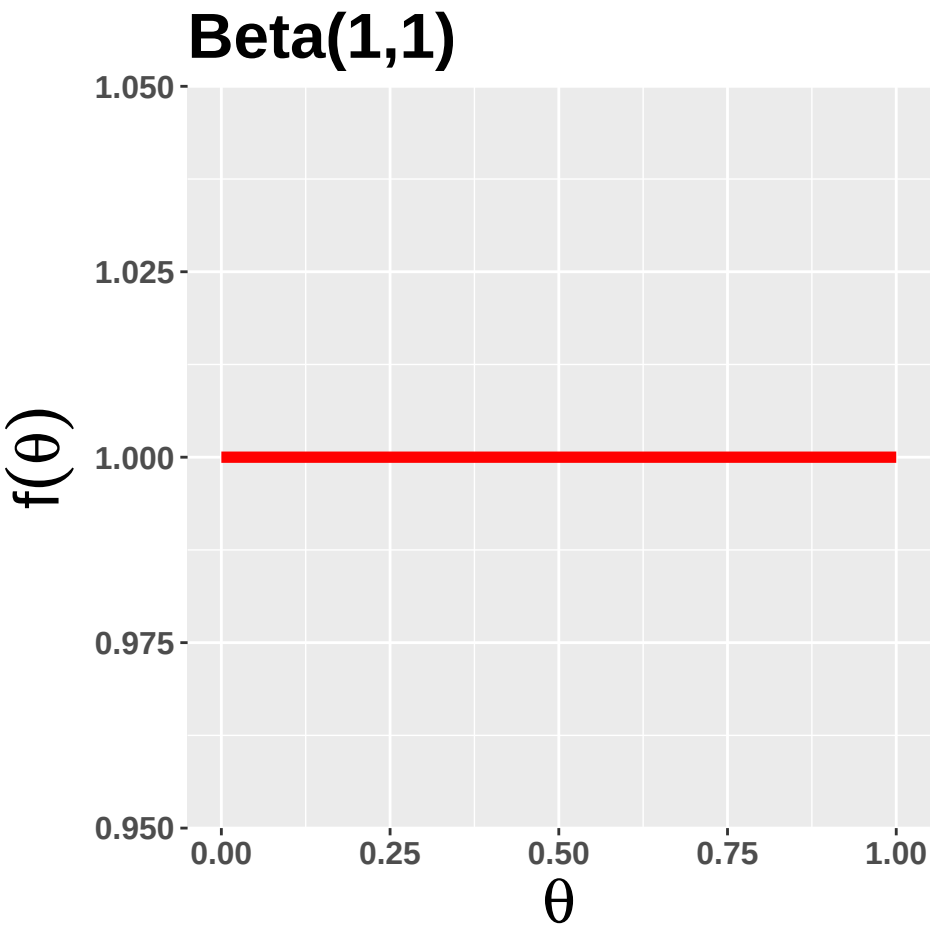


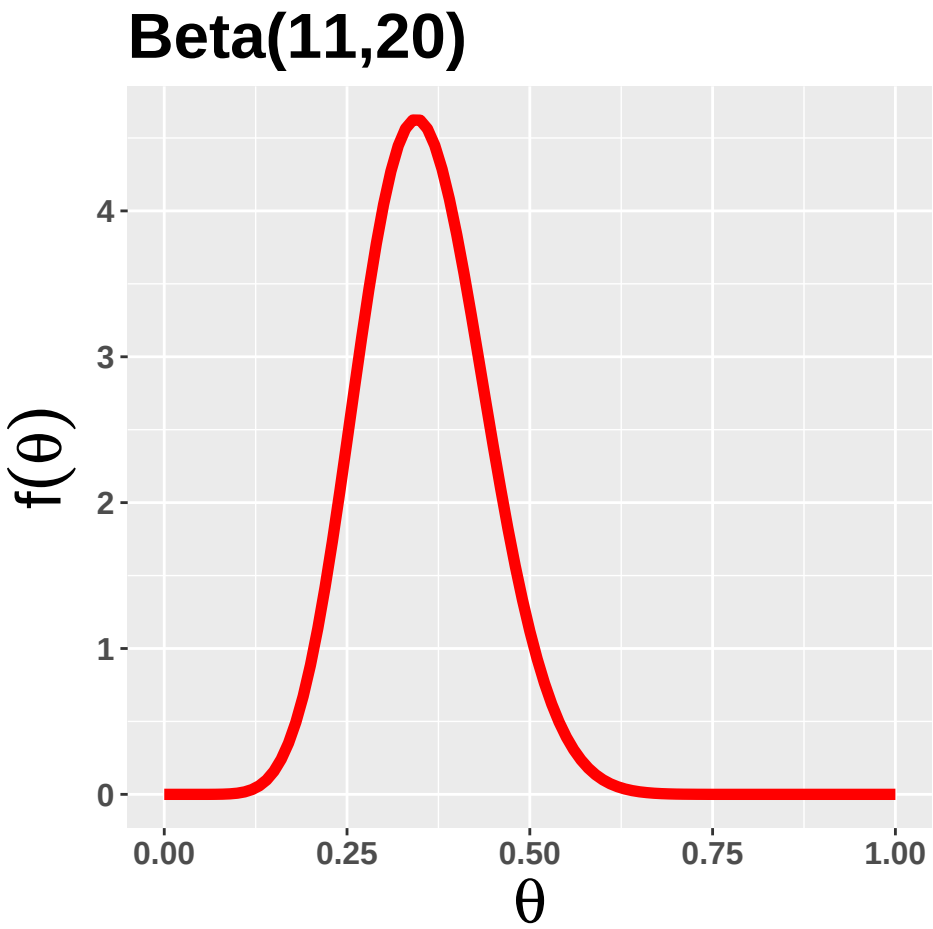

Figure 2: Posterior distributions and traceplots for the beta binomial example

Section 2

# Beta distribution plots

# Beta distribution



# Beta distribution