Lab 3

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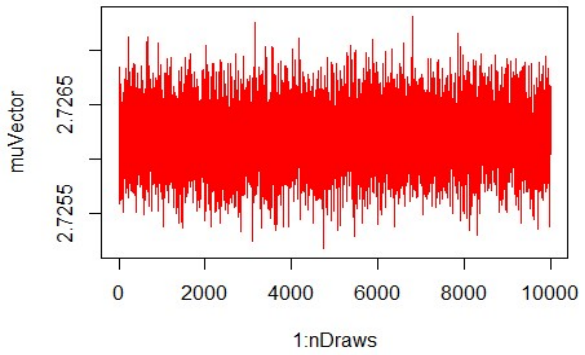
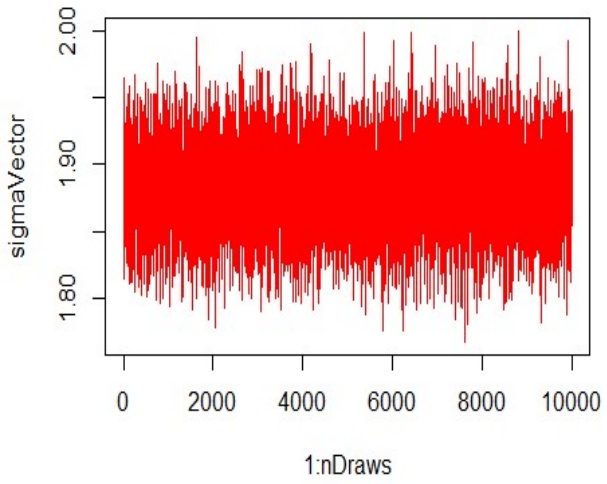
Assignment 1

a)

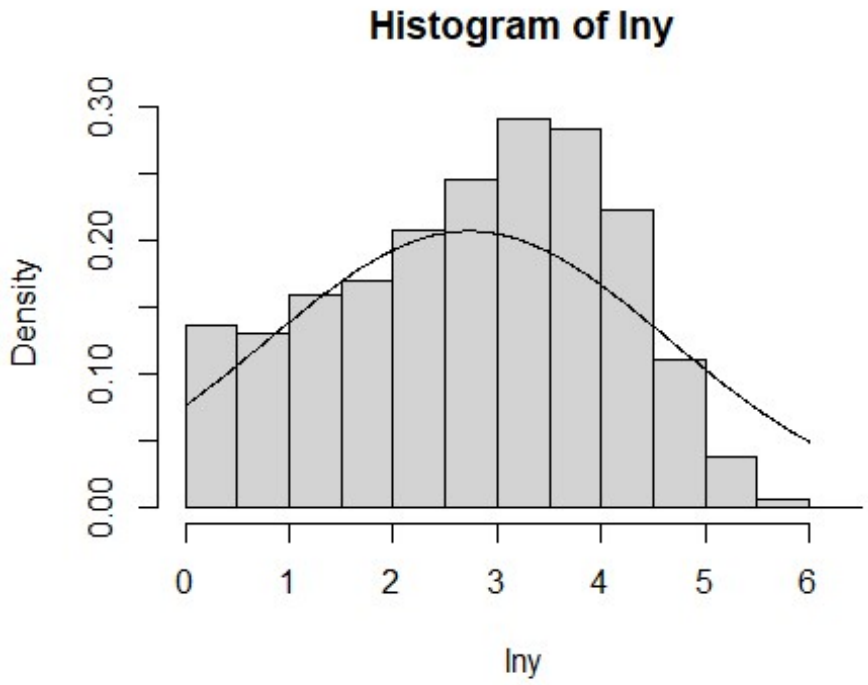





```
Inefficiency Factor (Mu):  3.013668

Inefficiency Factor (sigma):   2.93769
```

b)

The resulting posterior isn't a great fit.



Assignment 2

a)

VerifyID, Sealed, MinBidShare seem to have a larger impact and on the result and thus more significant.

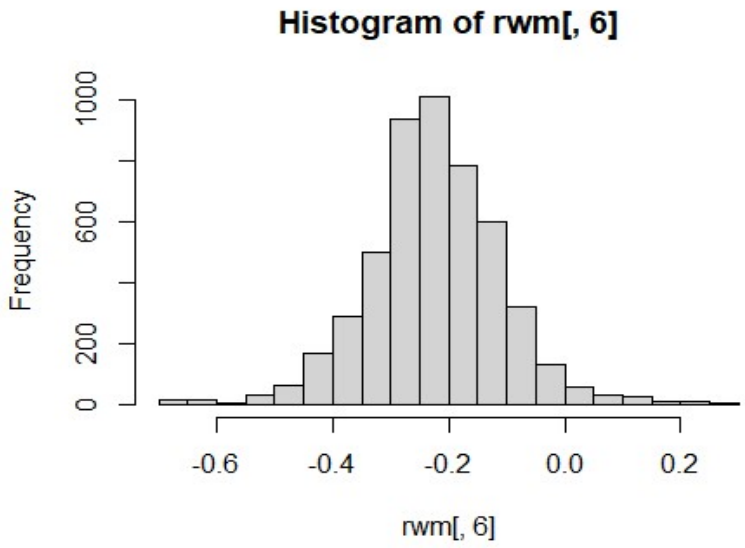
b)

```
Beta: 1.11957201 -0.07329982 -0.18009365  0.48578880  0.26479483  0.10822918
      0.08978112 -0.08166566 -1.49608573
```

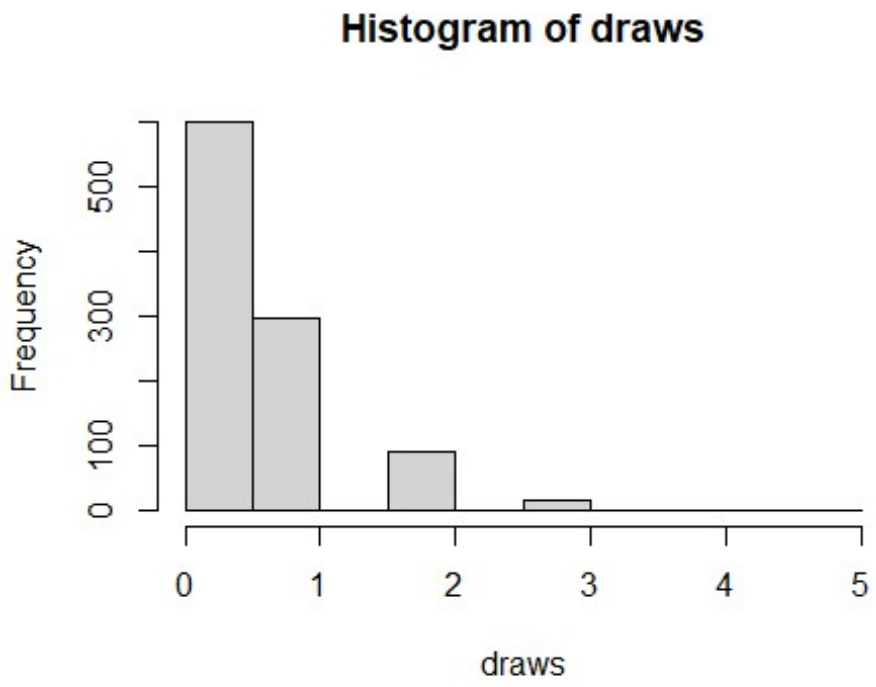
```
Inverse Hessian:

               [,1]          [,2]          [,3]          [,4]          [,5]
 [1,]  8.808580e-04 -6.826810e-04 -2.758014e-04 -2.859647e-04 -4.511314e-04
 [2,] -6.826810e-04  1.316877e-03  1.499105e-05 -2.552425e-04  1.146399e-04
 [3,] -2.758014e-04  1.499105e-05  6.837897e-03 -6.967214e-04 -7.593947e-05
 [4,] -2.859647e-04 -2.552425e-04 -6.967214e-04  2.491977e-03  3.703174e-04
 [5,] -4.511314e-04  1.146399e-04 -7.593947e-05  3.703174e-04  2.813479e-03
 [6,] -3.132743e-04 -1.741208e-04  2.415153e-04  4.518539e-04  3.660615e-04
 [7,] -5.035695e-04  2.610505e-04  3.323027e-04  3.393816e-04  6.431372e-05
 [8,]  4.057081e-05  1.002514e-04 -3.422433e-04 -9.498025e-05  6.786622e-05
 [9,]  8.713571e-04 -5.575327e-04 -4.804850e-04  2.405297e-05 -2.411212e-05
               [,6]          [,7]          [,8]          [,9]
 [1,] -0.0003132743 -5.035695e-04  4.057081e-05  8.713571e-04
 [2,] -0.0001741208  2.610505e-04  1.002514e-04 -5.575327e-04
 [3,]  0.0002415153  3.323027e-04 -3.422433e-04 -4.804850e-04
 [4,]  0.0004518539  3.393816e-04 -9.498025e-05  2.405297e-05
 [5,]  0.0003660615  6.431372e-05  6.786622e-05 -2.411212e-05
 [6,]  0.0065908127  4.193557e-04 -7.947830e-05  2.835410e-04
 [7,]  0.0004193557  3.159308e-03 -2.316811e-04 -5.465781e-05
 [8,] -0.0000794783 -2.316811e-04  7.927445e-04  9.257598e-04
 [9,]  0.0002835410 -5.465781e-05  9.257598e-04  4.386554e-03
```

c)

Here is one example of assessing the MCMC convergence graphically. It looks to follow a normal distribution.



d)

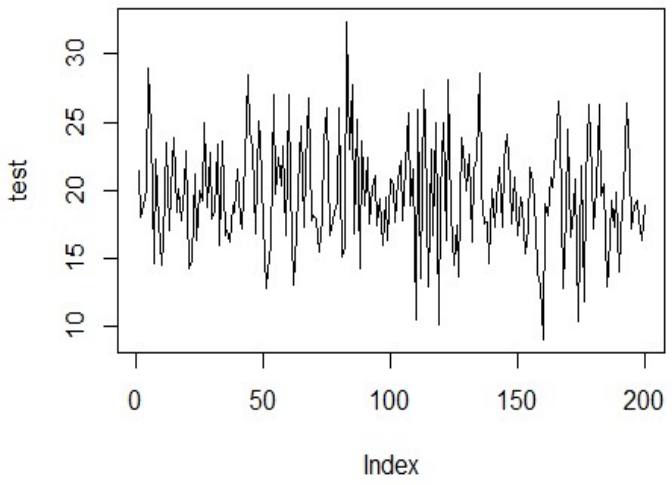



```
Probability of no bidders: 0.6
```

Assignment 3

a)

The larger absolute value of Phi, the more volatile the resulting AR(1). This is because the value of x at time t is more dependent of the value of x at time t-1, when abs(Phi) is larger.



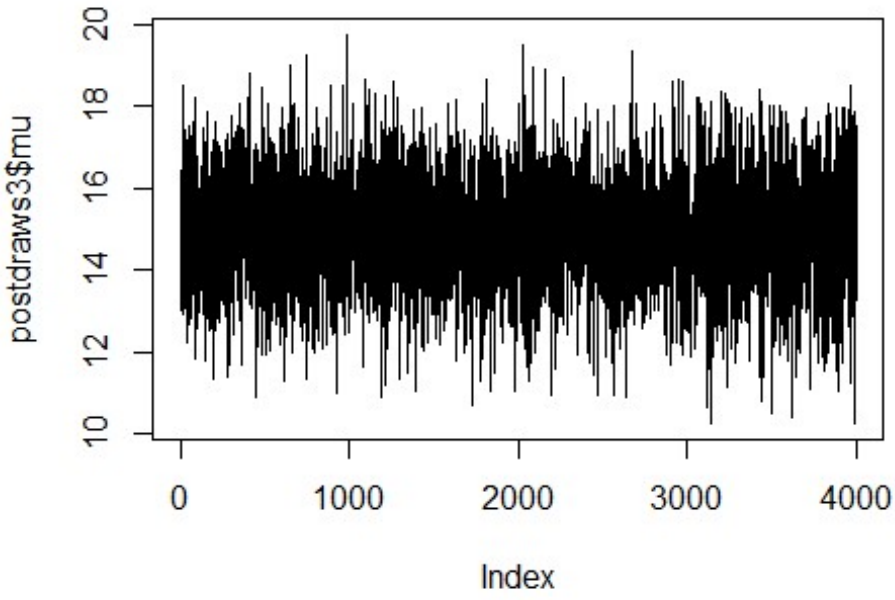
b)

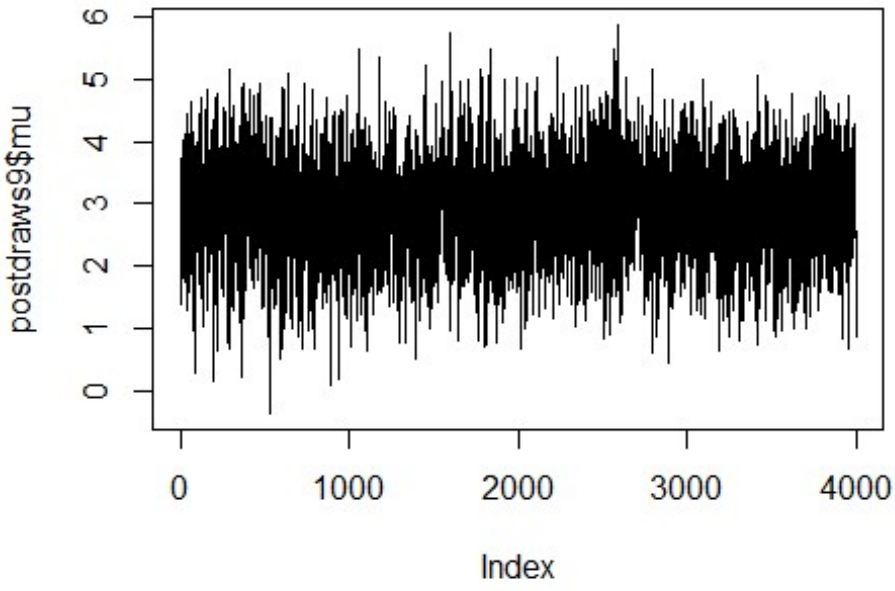
For fit3 it was alright. Mu was a little bit low. With a Rhat lower than 1.05 it has converged, which is the case

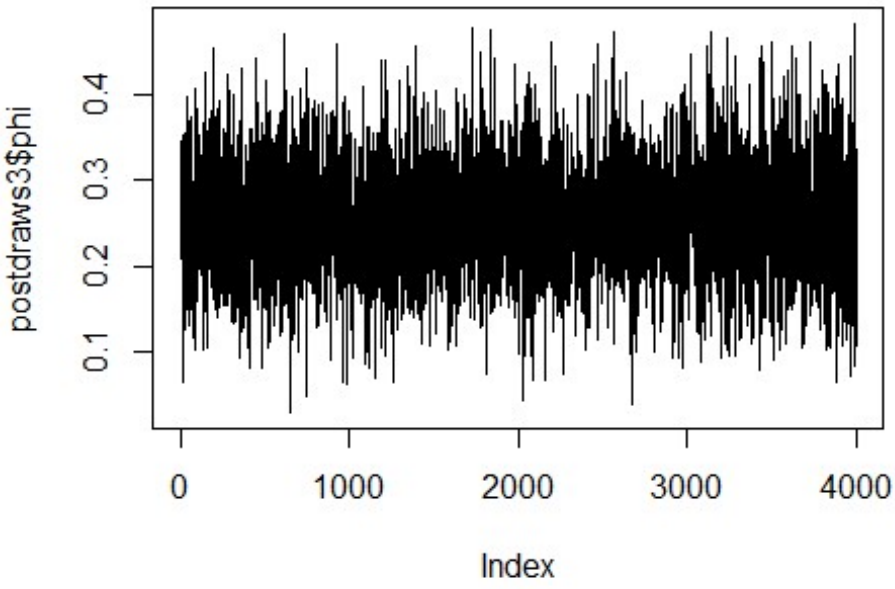
For fit9 sigma and phi was ok. Mu was very off. With a Rhat lower than 1.05 it has converged, which i sthe case

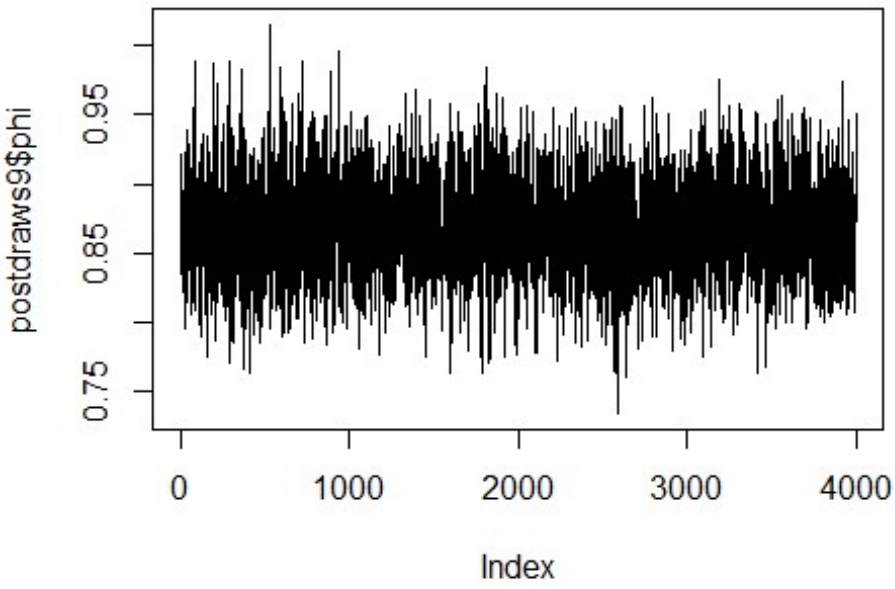
```
## 4 chains, each with iter=2000; warmup=1000; thin=1;
## post-warmup draws per chain=1000, total post-warmup draws=4000.
##
          mean se_mean    sd     2.5%      25%      50%      75%    97.5%
mu      14.954   0.037 1.395   12.161   14.030   14.962   15.910   17.622
phi      0.256   0.002 0.068    0.125    0.209    0.255    0.301    0.394
sigma    4.109   0.005 0.210    3.714    3.963    4.102    4.246    4.559

##         Rhat  n_eff
## mu     0.999   1401
## phi    0.999   1396
## sigma 1.001   1765
```

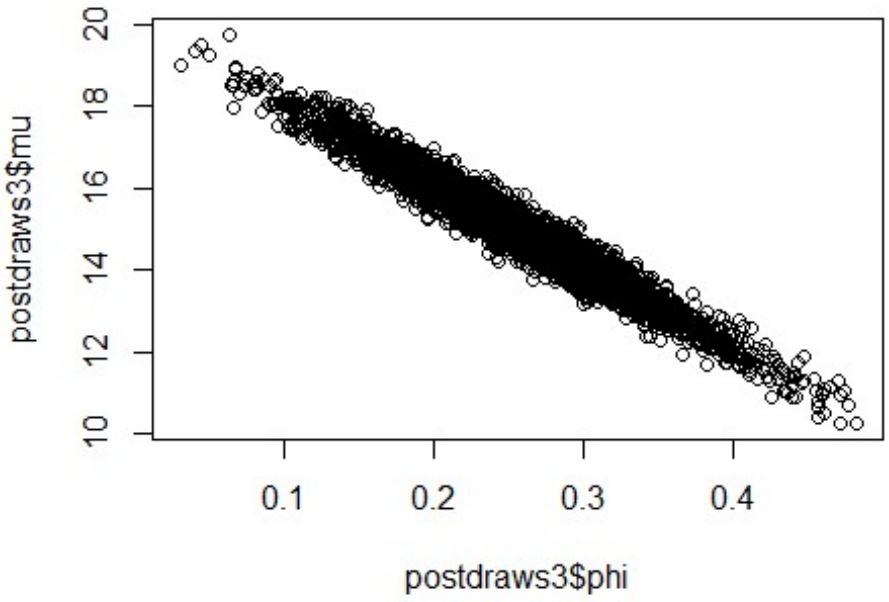
```
## 4 chains, each with iter=2000; warmup=1000; thin=1;
## post-warmup draws per chain=1000, total post-warmup draws=4000.

          mean se_mean    sd     2.5%      25%      50%      75%    97.5%
mu       2.913   0.023 0.840    1.235    2.336    2.910    3.515    4.499
phi      0.869   0.001 0.036    0.800    0.843    0.869    0.893    0.942
sigma    3.889   0.005 0.197    3.534    3.753    3.884    4.016    4.292

##        Rhat  n_eff
## mu    1.002   1381
## phi   1.001   1349
## sigma 1.002   1687
```

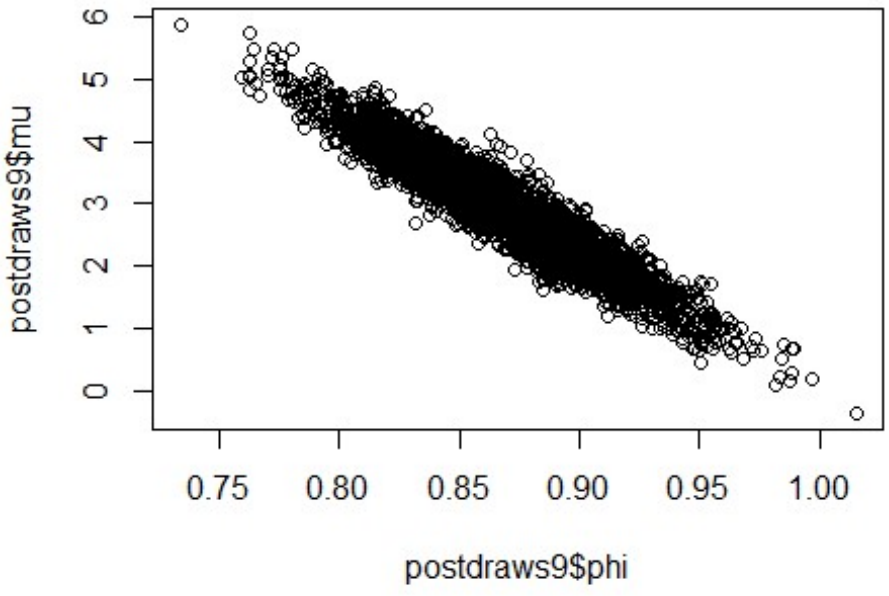

postdraws3$mu
10
12
14
16
18
20
0
1000
2000
3000
4000
Index


postdraws9$mu
0
1
2
3
4
5
6
0
1000
2000
3000
4000
Index


postdraws3$phi
0.1
0.2
0.3
0.4
0
1000
2000
3000
4000
Index


postdraws9$phi
0.75
0.85
0.95
0
1000
2000
3000
4000
Index


postdraws3$mu
10
12
14
16
18
20
0.1
0.2
0.3
0.4
postdraws3$phi


postdraws9$mu
0
1
2
3
4
5
6
0.75
0.80
0.85
0.90
0.95
1.00
postdraws9$phi