**EE 509: Lab Report 5**

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Lab Report Task 1

Table 1: Summary Statistics

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **mean** | **sd** | **MC\_error** | **val2.5pc** | **median** | **val97.5pc** | **start** | **sample** |
| deviance | 1826.0 | 1.393 | 0.01055 | 1825.0 | 1825.0 | 1830.0 | 1000 | 15003 |
| mean | 16.57 | 0.3019 | 0.002215 | 15.98 | 16.57 | 17.16 | 1000 | 15003 |

 

Figure 1: Density of deviance Figure 2: Density of mean





Figure 3: Plot of MCMC History

Table 2: Model settings

|  |  |
| --- | --- |
| **Length of MCMC:** | 6000 iterations |
| **Chains:** | 3 |
| **Beg:** | 1000 |
| **Thin:** | 1 |



Figure 4: Quantiles after 1000 iterations Figure 5: Quantiles after 6000 iterations

 

Figure 6: BGR diagnostic after 1000 iterations Figure 7:BGR diagnostic after 6000 iterations



Figure 8: Autocorrelation of deviance Figure 9: Autocorrelation of mean

Justification: Iterations were extended from 1000 to 6000 to so that quantiles for each chain would converge to the same value. The first 1000 iterations were cut because quantiles had not converged. No data were thinned because the autocorrelation graph indicated nearly 0 autocorrelation at all lags 1-100.

Lab Report Task 2:

Table 1: Summary Statistics

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **mean** | **sd** | **MC\_error** | **val2.5pc** | **median** | **val97.5pc** | **start** | **sample** |
| deviance | 1827.0 | 1.994 | 0.01532 | 1825.0 | 1826.0 | 1832.0 | 1000 | 17703 |
| mean | 16.58 | 0.3042 | 0.002139 | 15.98 | 16.58 | 17.17 | 1000 | 17703 |
| sd | 5.244 | 0.216 | 0.0016 | 4.846 | 5.238 | 5.688 | 1000 | 17703 |



Figure 1: Density of deviance Figure 2: Density of mean



Figure 3: Density of standard deviation





Figure 4: Plots of MCMC History

Table 2: Model settings

|  |  |
| --- | --- |
| **Length of MCMC:** | 6900 iterations |
| **Chains:** | 3 |
| **Beg:** | 1000 |
| **Thin:** | 1 |



Figure 4: Quantiles after 1000 iterations Figure 5: Quantiles after 6900 iterations

 

Figure 6: BGR diagnostic after 1000 iterations Figure 7:BGR diagnostic after 6900 iterations



Figure 9: Autocorrelation of mean (deviance and sd very similar)

Justification: Iterations were extended from 1000 to 6900 to so that quantiles for each chain would converge to the same value. The first 1000 iterations were cut because quantiles had not converged. No data were thinned because the autocorrelation graph indicated nearly 0 autocorrelation at all lags 1-100.

The mean looks very similar to task 1, but if you keep all the data (including first 1000), the mean is left-skewed compared to the mean in task 1.