Figure 4: Labeled clockwise starting from upper left: (a) Chain values for the log-likelihood, (b) Chain values for $\beta_0$, (c) Marginal posterior for $\beta_0$, (d) Marginal posterior for positions that are more similar the MLE estimate for $\beta_0$ is 2.38, with a graph with the square root of sum of squared distances of 15.77 while the MKL estimated the same quantities with 1.62 and 12.54.

The superiority of the MLE and MKL can be seen once again in these density plots for the number of ties in graphs generated by each of the estimates. The MLE and MKL seem to generate graphs which tend to have close to the observed value of 56 ties, while the posterior mean and mode estimates generate graphs with many more ties.

6 Discussion

This paper has provided a brief introduction to the latent space model for modeling network data as well as code which allows users to fit these models in the statistical freeware R. The code provided in the package latentnet is slightly different than the model originally presented by HRH in that all coefficients have a Gaussian prior, including the intercept. This
in the Florentine data) have a high probability. Figure 3 shows the density estimates of the number of ties produced from a probability distribution corresponding to the latent space model with each of the four parameter estimates. The MLE and MKL estimates appear to produce reasonable distributions on the number of ties, while the posterior mean and mode tend to generate graphs which have “too many” ties.

The better performance of the MKL could be due to the bi-modality of the posterior distribution of some actors. In Figure 2, it is noted that actors 1,10 and 13 are closer in the posterior mean and mode representation then in the MLE and MKL representation, thus they have a smaller distance when these first two positional estimates are used. Focusing attention on the troublesome actors (1,10,13) and the ties between them, shows some differences in the graphs generated by each of the estimates. The MLE estimates produces graphs which have on average 1.25 ties between the three actors, the posterior mean graphs have on average 2.98 ties, the posterior mode graphs have an average 2.98 ties and finally the MKL graphs have on average of 1.48 ties. In the observed graph there is one tie between these three actors.