Law of Large Graphs

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1 Introduction

2 Background

3 Theory

4 Simulations

To demonstrate the previous results, we simulate random graphs from a SBM with parameters.

$$B = \begin{bmatrix} .42 & .2 \\ .2 & .7 \end{bmatrix}, \qquad \rho = \begin{bmatrix} .5 & .5 \end{bmatrix}$$

From this model we sample M Adjacency Matrices with N vertices to calculate both $\bar{A}$ and $\hat{P}$. With these estimators for P, we calculate the mean squared error of each block region in the model, and compare these with our predictions.

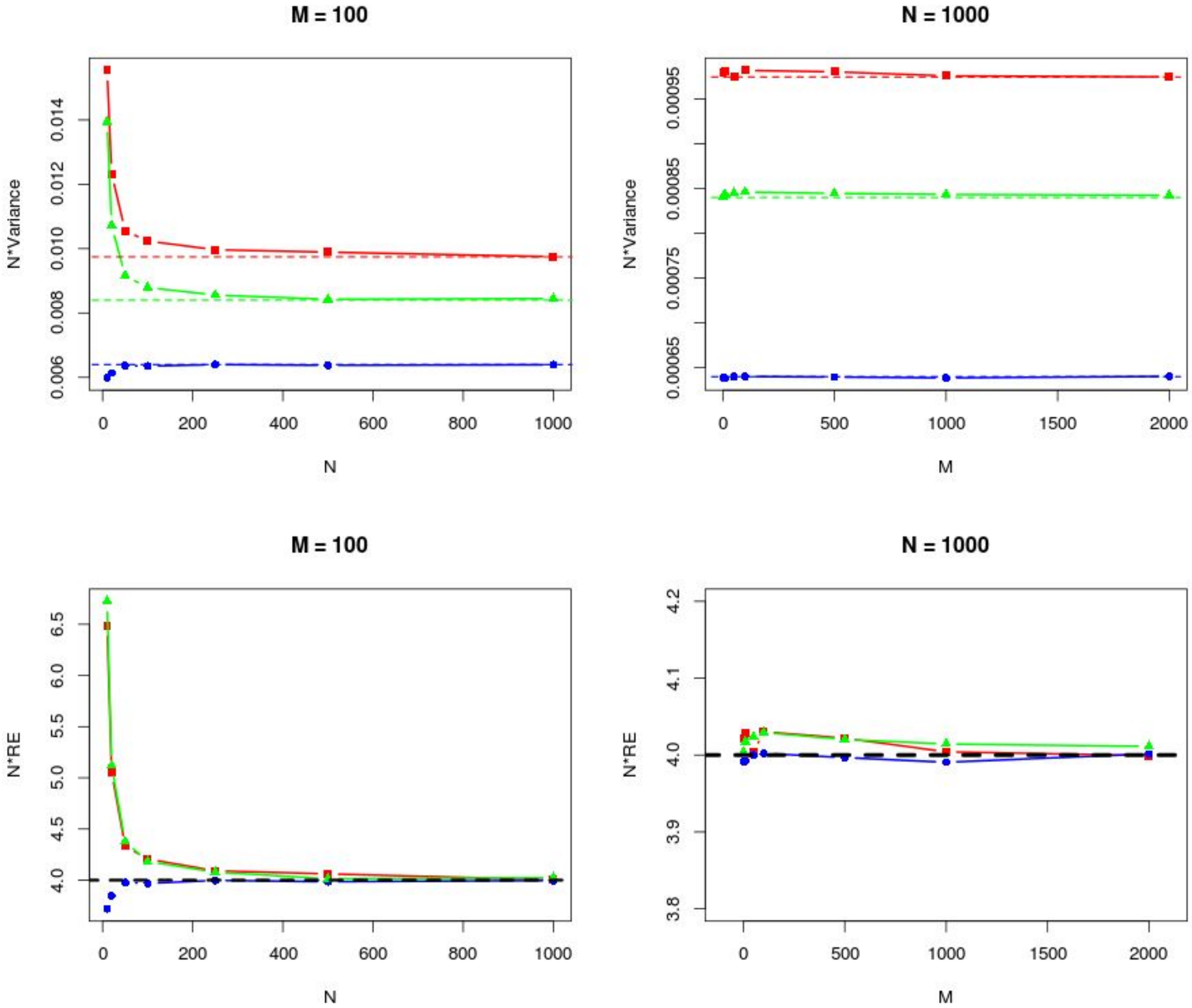

Figure 1: N*Variance($\hat{P}$) and RE, dotted lines represent the predictions and each color represents unique values within the true $P \in \{.2, .42, .7\}$

We now examine simulations where we vary the ρ vector for the SBM with the following parameters:

$$B = \begin{bmatrix} .42 & .2 \\ .2 & .7 \end{bmatrix}, \qquad N = 500, \qquad M = 100$$

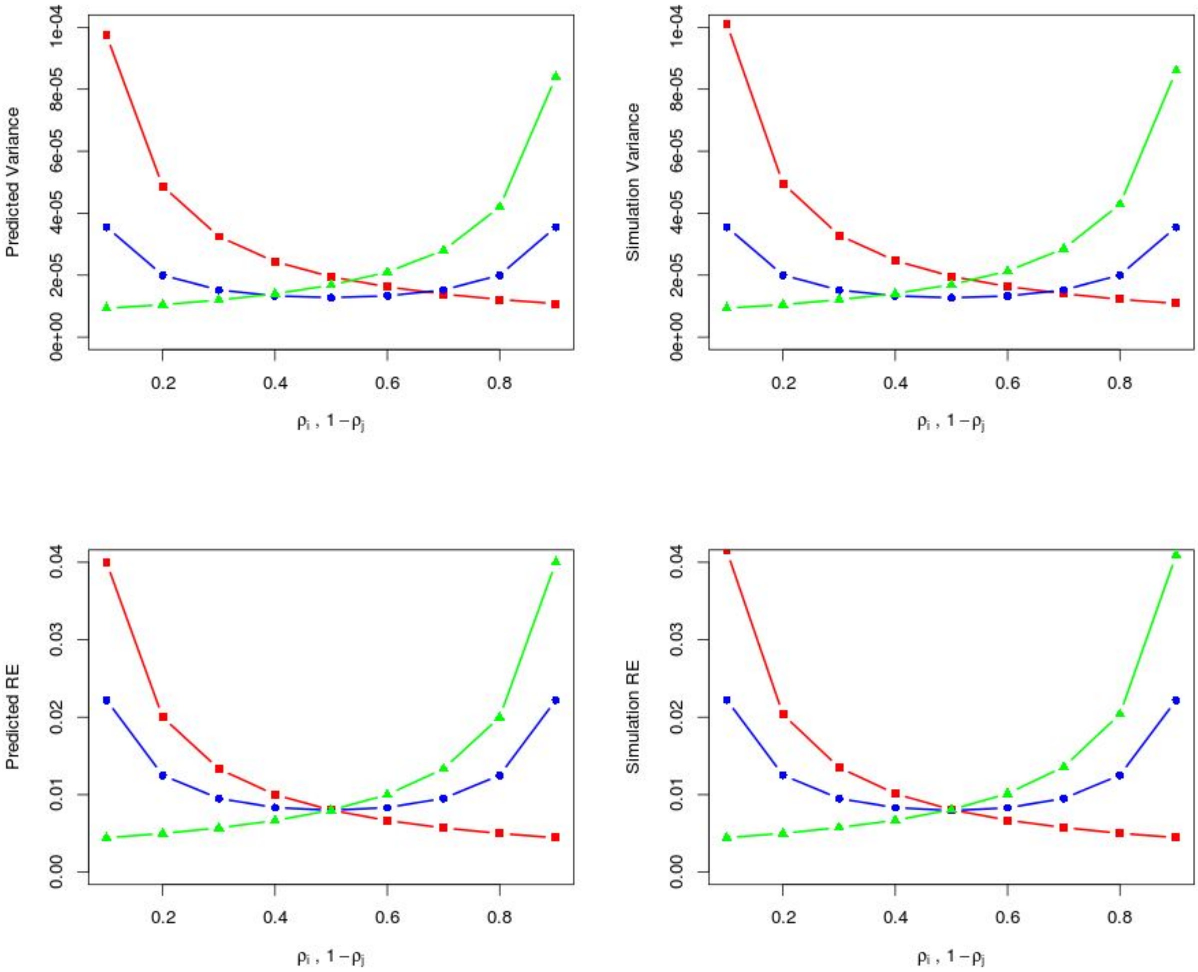

Figure 2: N*Variance($\hat{P}$) and RE, plots on the left are Predicted values corresponding to the right plot and each color represents unique values within the true $P \in \{.2, .42, .7\}$

5 Real Data

6 Discussion