

## Before

On February 5th, we talked about 4 situations in the simulation:

- $L$  matrix (binary-valued) + Network Guided Thresholding (already done)
- $C$  matrix (continuous) + NG Banding (already done)
- $L$  matrix + NG Banding
- $C$  matrix + NG Thresholding

### Q1

I think the 3rd situation " $L$  + NG Banding" is unfeasible, because we cannot know any ordering from a binary-valued information matrix.

### Q2

The 4th situation " $C$  + NG Thresholding". We must convert  $\hat{C}(\eta)$  into  $\hat{L}(l, p, q)$ , where  $\eta$  is

**Assumption 4.** Represent the proxy correlation matrix as columns.  $C = (c_1, \dots, c_N)$  and  $\hat{C} = (\hat{c}_1, \dots, \hat{c}_N)$ . Then

$$\exists \eta \in (0, 1], \forall i, \forall k, \lim_{T \rightarrow \infty} \Pr\{S_{\eta k}^{c_i} \subseteq S_k^{\hat{c}_i}\} = 1.$$

and  $l, p, q$  are

Parameter	Description
$\rho$	Determines how strong the correlation is and the sparsity of the covariance matrix $\Sigma$
$l$	Observation level, determines how we classify a pair $(i, j)$ as important, i.e., $L_{ij} = 1$ .
$p$	Conditional on $L_{ij} = 1$ , the probability of actually observing $G_{ij} = 1$ .
$q$	Conditional on $L_{ij} = 0$ , the probability of observing $G_{ij} = 1$
$\tau$	The Threshold level when we apply generalized thresholding operator on $\sigma_{ij}$ where $G_{ij} = 0$ .

Table 1: Description of varying parameters.

( $G$  matrix in the old version notation is  $\hat{L}$  in the new version notation.)

### Q2.1

But there isn't an one-to-one match between  $\hat{C}$  and  $\hat{L}$ .

### Q2.2

You may think we can just pretend  $\hat{L}_{fake} := I(i \in S_k^{\hat{c}_j} \wedge j \in S_k^{\hat{c}_i})$ , where  $\hat{c}_i$  is the  $i$ -th column of  $\hat{C}$  and  $k$  is determined by the CV of NG Banding, then apply NG Thresholding.

But then, the only difference between the two methods is whether we apply thresholding on  $\hat{\sigma}_{ij}$  where  $\hat{L}_{fake} = 0$ .

After

A1

For ' $L$  + NG Banding', write in the article that 'this method is unapplicable'.

A2

It's true that we cannot directly compare  $L$  and  $C$ .

After ' $L$  + NG Threshodling' and ' $C$  + NG Banding' have finished, list a table to compare. For example, given  $\Sigma_{AR1}$  and Frobenius norm, list the ratio of two error rates.

$(l,p,q) \setminus \eta$	0.5	0.8	...
(0.5, 0.1, 0.1)	ratio_1	ratio_2	
(0.6, 0.1, 0.1)	ratio_3	ratio_4	
...			