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A SAMPLE DOCUMENT[*]

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The abstract should summarize the contents of the paper. It should be clear, descriptive, self-explanatory and not longer than 200 words. It should also be suitable for publication in abstracting services. Please avoid using math formulas as much as possible.

1. Introduction.

2. Model.

2.1. *Notations.*

2.2. *SBM.* Denote the p nodes by $n_1, n_2, \cdots, n_p$. Let $Z_i \in \{1, 2, \cdots, K\}$ be the cluster that node n_i belongs to, where K is the number of clusters. Denote by $C_{k\times k}$ the connecting probability matrix, where $C_{kl} := P(n_i, n_j \text{ are connected} | Z_i = k, Z_j = l)$. The observed adjacency matrix $A_{p\times p}$ is defined as

$$A_{ij} = \begin{cases} 1, n_i \text{ and } n_j \text{ are connected;} \\ 0, \text{otherwise.} \end{cases}$$

SBM models this matrix by Bernoulli distribution, that is $A_{ij} \sim \text{Bernoulli}(C_{Z_iZ_j})$.

2.3. *Dynamic Generalization of SBM.* We consider the pairwise interactions of n individuals during some time interval $[0, T]$. The interactions are assumed to be undirected and without self-interactions. The set of all pairs of individuals (i.e. the set of all possible dyads in the graph) is denoted

$$\mathcal{R} = \{(i, j) : i, j = 1, \ldots, n;\ i < j\},$$

whose cardinality is $r = n(n-1)/2$. We observe the interaction time during the time interval $[0, T]$, that is

$$\mathcal{T} = \{t_{i,j}, (i, j) \in \mathcal{R}\},$$

[*]Footnote to the title with the “thankstext” command.
[†]Some comment
[‡]First supporter of the project
[§]Second supporter of the project

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where $t_{i,j}$ corresponds to the time that an edge is built between the ith individual and the jth individual occurs. For notation convenience we also define $t_{j,i} = t_{i,j}$ for $(i,j) \in \mathcal{R}$.

Every individual is assumed to belong to one out of m groups and the relation between two individuals, that is the way they interact with another, is driven by their group membership, as well as their spatial locations and the time lag. Let $Z_1, \dots, Z_n$ be independent and identically distributed (latent) random variables taking values in $\{1, \dots, m\}$. For the moment, m is considered to be fixed and known.

For every pair $(i,j) \in \mathcal{R}$ the interaction between individual i and j conditional on the latent groups $Z_1, \dots, Z_n$ is modelled by a counting process $N_{i,j}(\cdot) \in \{0,1\}$ with intensity function depending on their group memberships, spatial distance and time lag. For $q, l = 1, \dots, m$ and $(i,j) \in \mathcal{R}$ the intensity of $N_{i,j}(\cdot)$ is

$$\lambda_{i,j}(t) = f_{Z_i,Z_j}(t - \tau_{i,j}) \cdot g(d_{i,j}),$$

where $\tau_{i,j}$ and $d_{i,j}$ represent the time lag and the spatial distance between indivial i and j, $f_{ql}(\cdot)$ accounts for the connecting intensity between group q and l for $q, l \in \{1, \cdots, m\}$, and $g(\cdot)$ is a decreasing function that accounts for the decay of connection as the distance between individuals increases.

The set of observations $\mathcal{T}$ is a realization of the multivariate counting process $\{N_{i,j}(\cdot)\}_{(i,j)\in\mathcal{R}}$ with conditional intensity $\{\lambda_{i,j}(t)\}_{(i,j)\in\mathcal{R}}$. If $\tau_{i,j}$ can be estimated using prior information (such as birth time), then for individual i the integrated observation $t_{i,\cdot} + \tau_{i,\cdot} := \{t_{i,j} + \tau_{i,j}\}_{j \neq i}$ is a realization of the counting process $\sum_{j \neq i} N_{i,j}(\cdot)$ with intensity

$$\Lambda_i(t) = \sum_{l=1}^{m} \left(\sum_{j: Z_j = l, j \neq i} g(d_{i,j}) \right) \cdot f_{Z_i l}(t) = \sum_{l=1}^{m} w_{i,l} \cdot f_{Z_i l}(t),$$

where $w_{i,l} = \sum_{j:Z_j = l, j\neq i} g(d_{i,j})$ measures the overall distance between the individual i and the group l. Denote the integrated observations by $\mathcal{O} = \{t_{i,\cdot} + \tau_{i,\cdot}, i = 1, \cdots, n\}$, the clustering matrix by $Z_{n\times m}$ with entries $Z_{i,q} = \mathbf{1}_{\{Z_i = q\}}$, and the connecting intensity matrix by $F_{m\times m} = [F_{ql}(\cdot)]_{q,l\in\{1,\cdots,m\}}$. Also let $W_{n\times m} = [w_{i,l}]_{i\in\{1,\cdots,n\}, l\in\{1,\cdots,m\}}$. Then the intensities of $\mathcal{O}$ can be

TABLE 1
The spherical case ($I_1 = 0$, $I_2 = 0$)

Equil. Points	x	y	z	C	S
L_1	−2.485252241	0.000000000	0.017100631	8.230711648	U
L_2	0.000000000	0.000000000	3.068883732	0.000000000	S
L_3	0.009869059	0.000000000	4.756386544	−0.000057922	U
L_4	0.210589855	0.000000000	−0.007021459	9.440510897	U
L_5	0.455926604	0.000000000	−0.212446624	7.586126667	U
L_6	0.667031314	0.000000000	0.529879957	3.497660052	U
L_7	2.164386674	0.000000000	−0.169308438	6.866562449	U
L_8	0.560414471	0.421735658	−0.093667445	9.241525367	U
L_9	0.560414471	−0.421735658	−0.093667445	9.241525367	U
L_{10}	1.472523232	1.393484549	−0.083801333	6.733436505	U
L_{11}	1.472523232	−1.393484549	−0.083801333	6.733436505	U

writen as

$$\begin{bmatrix} \Lambda_1(\cdot) \\ \vdots \\ \Lambda_n(\cdot) \end{bmatrix} = \operatorname{diag}\left(CFW^\top\right).$$

3. Method.

4. Theory.

5. Notes. Footnotes[1] pose no problem[2].

6. Displayed text. Example of a theorem:

THEOREM 6.1. *All conjectures are interesting, but some conjectures are more interesting than others.*

PROOF. Obvious. □

7. Tables and figures. Cross reference to labeled table: As you can see in Table 1 on page 3 and also in Table 2 on page 4.

$$C_s = K_M \frac{\mu/\mu_x}{1 - \mu/\mu_x} \tag{7.1}$$

Sample of cross-reference to figure. Figure 1 shows that is not easy to get something on paper.

[1]This is an example of a footnote.
[2]And another one

TABLE 2
Parameter sets used by Bajpai & Reuß

parameter		*Set 1*	*Set 2*
μ_x	[h^{-1}]	0.092	0.11
K_x	[g/g DM]	0.15	0.006
μ_p	[g/g DM h]	0.005	0.004
K_p	[g/L]	0.0002	0.0001
K_i	[g/L]	0.1	0.1
$Y_{x/s}$	[g DM/g]	0.45	0.47
$Y_{p/s}$	[g/g]	0.9	1.2
k_h	[h^{-1}]	0.04	0.01
m_s	[g/g DM h]	0.014	0.029

FIG 1. *Pathway of the penicillin G biosynthesis.*

APPENDIX A: APPENDIX SECTION

Some words.

A.1. Appendix subsection. See Appendix A.

ACKNOWLEDGEMENTS

See Supplement A for the supplementary material example.

SUPPLEMENTARY MATERIAL

Supplement A: Title of the Supplement A
(http://www.e-publications.org/ims/support/dowload/imsart-ims.zip). Dum esset rex in accubitu suo, nardus mea dedit odorem suavitatis. Quoniam confortavit seras portarum tuarum, benedixit filiis tuis in te. Qui posuit fines tuos

REFERENCES

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