



空间广义线性混合效应模型及其应用

Spatial Generalized Linear Mixed Models with Its Applications

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1 引言

2 Section title

研究背景

我做了什么

有什么意义

怎么做的

This is an R Markdown presentation (Xie, 2016). Markdown is a simple formatting syntax for authoring HTML, PDF, and MS Word documents. For more details on using R Markdown see <http://rmarkdown.rstudio.com>.

模型假设

Multiple prevalence surveys

Sample n_i individuals, observe Y_i positives, $i = 1, 2, \dots, m$

$$Y_i \sim \text{Bin}(n_i, p_i)$$

Extra-binomial variation

Sample n_i individuals, observe Y_i positives, $i = 1, 2, \dots, m$

$$Y_i | d_i, U_i \sim \text{Bin}(n_i, p_i) \quad \log[p_i / (1 - p_i)] = d_i' \beta + U_i \quad U_i \sim N(0, \tau^2)$$

notations: Spatial Generalized Linear Mixed Models (SGLMM)

1 Latent spatially correlated process

- Stationary Gaussian Process: $S(x) \sim \text{SGP}\{0, \sigma^2, \rho(u)\}$
- correlation function: e.g. $\rho(u) = \exp(-|u|/\phi)$

2 Linear prediction (regression model)

- $d(x)$ = covariates at location x
- Linear prediction: $\eta(x) = d(x)' \beta + S(x)$
- Link function: $\text{logit } p(x) = \log\{\eta(x)/[1 - \eta(x)]\}$

3 Conditional distribution for positive proportion Y_i/n_i

- $Y_i | S(\cdot) \sim \text{Bin}(n_i, p(x_i))$ (binomial sampling)

模拟实验

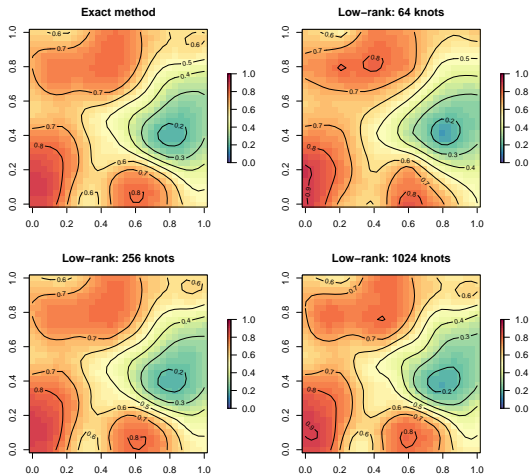
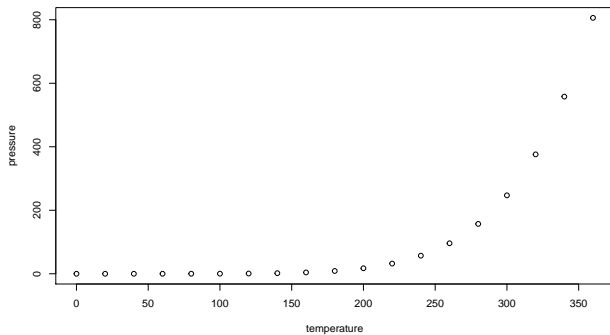


图 1: 精确方法与近似方法比较

还能怎么做



Spatial data in R

- 动态文档 (Xie, 2015, 2016) 和 (Xie et al., 2017)
- 统计图形 (Wickham, 2016)
- 空间统计 (Venables and Ripley, 2002) 和 (Bivand et al., 2013)

Edzer Pebesma : useR! international R User conference

- 1 Spatial data in R: simple features and future perspectives (2016)
 - 2 Spatial data in R: new directions (2017)
 - 3 Spatial data in R: new directions II (2017)
- UseR! tutorial <https://edzer.github.io/UseR2017/>

Binomial Theorem

$$f(k) = \binom{n}{k} p^k (1-p)^{n-k} \quad (1)$$

Hello Equation 1

Title for block box

Unordered List

- University of Illinois at Urbana-Champaign (UIUC)
- Department of Statistics
- Illinois Informatics Institute

Redux L^AT_EX

This theme supports special LaTeX macros `\beingcols` and `\endcols` that allows for markdown to be blended with LaTeX without triggering the `raw_tex` extension. To enable this feature, the `safe-columns` key in the YML head matter must be set equal to `true`.

● *Hello!*

① **Goodbye!**

Code Embedding

```
#> [1] 5
```

Inline R code refering to variable in previous code chunk:

```
2
```

参考文献 I

- Bivand, R. S., Pebesma, E., and Gomez-Rubio, V. (2013). *Applied spatial data analysis with R*. Springer, New York, 2nd edition.
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