

Spatial Generalized Linear Mixed Models with Application to Prevalence Mapping

空间广义线性混合模型及其在预测流行病中的应用
2015级硕士学位论文答辩

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Outline 目录

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这是一个CJKutf8的例子，使用的字体是gbsn

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)

- Latent spatially correlated process
Stationary Gaussian Process: $S(x) \sim \text{SGP}\{0, \sigma^2, \rho(u)\}$
correlation function: e.g. $\rho(u) = \exp(-|u|/\phi)$
- Linear prediction (regression model)
 $d(x)$ = covariates at location x
Linear prediction: $\eta(x) = d(x)' \beta + S(x)$
Link function: $\text{logit } p(x) = \log\{\eta(x)/[1 - \eta(x)]\}$
- Conditional distribution for positive proportion Y_i/n_i
 $Y_i | S(\cdot) \sim \text{Bin}(n_i, p(x_i))$ (binomial sampling)