

519.766.4

« » «resecum» ó [1].

[1, 2].

ø , ø () ; (2) : (1) () ø ó () ; (3)

ø (:) ();) () ø - ø

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, : (1) , ø

; (2)

; (3) : (1) ; (2)

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N ; (3)); (2)

(, ; (4)

(= 1,2,..., N) [5]. X_i i-

$$S = \sum_{i=1}^N X_i$$

S u, :

$$R = p \left\{ \sum_{i=1}^N X_i > u \right\}.$$

() ó N,

$$S = \sum_{i=1}^N X_i$$

$$\frac{S_N - E[S_N]}{\sqrt{\text{var}[S_N]}}$$

(0; 1).

[6]:

$$R = p \{ S_N > u \} = 1 - \mathbf{N}_{0,1} \left(\frac{u - E[S_N]}{\sqrt{\text{var}[S_N]}} \right),$$

$\mathbf{N}_{0,1}(S)$ ó

(0; 1) S.

: (1)

(2)

; (3) $X_1, X_2, \dots,$

; $X_i -$

i-

X_1, X_2, \dots ó

; (4)

$N(t)$ ó

X_1, X_2, \dots ó

R

$$S(t) = \sum_{i=1}^{N(t)} X_i$$

u:

$$R = p \{ S(t) > u \}.$$

[7]:

$$U(t) = u + ct - S(t),$$

$U(t) -$

; u -

; c -

; $S(t) -$

ø

0 t,

, $N(t) \sim P_0(\lambda t),$

$t \geq 0.$

$N(t)$ ó
 X_1, X_2, \dots ó

$\psi(u)$

u;

$$\psi(u) \leq \exp(-Ru),$$

R -

ø

:

$$\lambda + cr = \lambda M_X(r),$$

$\lambda -$

; c -

$M_X(r) -$

R

ø , u , 1%.

$\psi(u)$

$\psi(u)$
u,

λ ($\lambda=1$).
n $X = (x_1, x_2, \dots, x_n)$,

R;

R ($\psi(u)$)

(AIC BSC).
 $\psi(u)$.

$\psi(u|x)$

R.

$$\psi(u|x) = E[I|x] = E[E(I|R)|x] \leq E[\exp(-Ru)|x], \tag{1}$$

$I = 1$, $I = 0$; $R = 0$,
 $c \leq \lambda E[X_i|\theta_i, M_i]$, X_i, θ_i, M_i - , i -

$E[\exp(-Ru)|x] \geq \exp(-\mu_R u)$, $\mu_R = E(R|x)$.

i - (θ_i) n

() , :

$$\theta_i \sim N(\check{\theta}_i, H_i^{-1}),$$

$\check{\theta}_i$ -

; H_i -

$$\check{\theta}_i; \lim_{n \rightarrow \infty} H_i^{-1} = O(n^{-1}). \quad (\lambda=1)$$

$1 + cR = M_i(R, \theta_i)$, $M_i(R, \theta_i)$ - i -

$M_i(R, \theta_i)$

($\check{R}_i, \check{\theta}_i$):

$$M_i(R, \theta_i) = M_i(\check{R}_i, \check{\theta}_i) + \frac{\partial M_i(\check{R}_i, \check{\theta}_i)}{\partial R} (R - \check{R}_i) + \sum_{j=1}^{k_i} \frac{\partial M_i(\check{R}_i, \check{\theta}_i)}{\partial \theta_{ij}} (\theta_{ij} - \check{\theta}_{ij}) + O\left(|R - \check{R}_i, \theta_i - \check{\theta}_i|\right)$$

k_i -

θ_i .

$$1 + c\check{R}_i = M_i(\check{R}_i, \check{\theta}_i)$$

$$1 + cR \approx 1 + c\check{R}_i + m_{i_r} (R - \check{R}_i) + \sum_{j=1}^{k_i} m_{i_j} (\theta_{ij} - \check{\theta}_{ij}),$$

$$m_{i_r} = \frac{\partial M_i(\check{R}_i, \check{\theta}_i)}{\partial R}; \quad m_{i_j} = \frac{\partial M_i(\check{R}_i, \check{\theta}_i)}{\partial \theta_{ij}}, \quad j = 1, 2, \dots, k_i.$$

:

$$(c - m_{ir})R \approx (c - m_{ir})\check{R}_i + \sum_{j=1}^{k_i} m_{ij}(\theta_{ij} - \check{\theta}_{ij}),$$

$$R(\theta_i) \approx \check{R}_i + \frac{1}{c - m_{ir}} m_i^T (\theta_i - \check{\theta}_i), \quad (2)$$

$$m_i^T = [m_{i1}, m_{i2}, \dots, m_{ik_i}].$$

$$\sigma_i^2 = \frac{1}{(c - m_{ir})^2} m_i^T H_i^{-1} m_i. \quad \lim_{n \rightarrow \infty} H_i^{-1} = O(n^{-1}), \quad \sigma_i^2 = O(n^{-1}) \quad n \rightarrow \infty;$$

$$\Pr[R \leq r | x, M_i] = \begin{cases} 0, & r < 0; \\ \Phi\left(-\frac{\check{R}_i}{\sigma_i}\right), & r = 0; \\ \Phi\left(-\frac{r - \check{R}_i}{\sigma_i}\right), & r > 0. \end{cases} \quad (3)$$

$$p_i = \Pr(M_i | x)$$

$$f_{i^*}(r | x), \quad f(r | x) = \sum_i p_i f_i(r | x).$$

$$(1): \psi(u | x) \leq E[\exp(-Ru) | x]. \quad (3)$$

$$E[\exp(-Ru) | x, M_i] = \exp\left[-\check{R}_i u + \frac{1}{2} \sigma_i^2 u^2\right] \left\{ 1 - \Phi\left(\frac{-\check{R}_i + u \sigma_i^2}{\sigma_i}\right) \right\} + \Phi\left(\frac{-\check{R}_i}{\sigma_i}\right), \quad (4)$$

$$\Phi(\cdot) -$$

$$\psi(u) \leq \exp\left[-\check{R}_{i^*} u + \frac{1}{2} \sigma_{i^*}^2 u^2\right] \left\{ 1 - \Phi\left(\frac{-\check{R}_{i^*} + u \sigma_{i^*}^2}{\sigma_{i^*}}\right) \right\} + \Phi\left(\frac{-\check{R}_{i^*}}{\sigma_{i^*}}\right), \quad (5)$$

$$\psi(u) \leq \sum_i p_i \exp\left[-\check{R}_i u + \frac{1}{2} \sigma_i^2 u^2\right] \left\{ 1 - \Phi\left(\frac{-\check{R}_i + u \sigma_i^2}{\sigma_i}\right) \right\} + \Phi\left(\frac{-\check{R}_i}{\sigma_i}\right). \quad (6)$$

$$M_i, i = 1, \dots, 10$$

$$Y : \alpha_i \quad \gamma.$$

$$f(y) = \frac{\gamma^\alpha y^{\alpha-1} e^{-\gamma y}}{\Gamma(\alpha)},$$

" \emptyset - , 2012. 9 : , "

$$\bar{y} = \alpha / \gamma \quad \text{Var}(y) = \alpha / \gamma^2 .$$

$\gamma \cdot$

: $p(M_i) = 0,1; i = 1, \dots, 10,$ γ ,

(0, ∞).

1000 : $\mu = 1$

$\sigma^2 = 0,15$ (
 $c = 1, 1$).

(4) ó (6).

$u_1 = 31,1$ ($G_1(u) = \exp(-Ru) = 0,01$); $u_2 = 37,5$ $0,01.$ u , :
 $G_2(u) = E[\exp(-Ru) | x, M_5] = 0,01$ $i^* = 5;$ $u_3 = 39,2$ \emptyset :
 $G_2(u) = E[\exp(-Ru) | x] = 0,01.$, \emptyset :

, ó

\emptyset , : , ; , \emptyset \emptyset \emptyset ;

R

1. : / ó : , 1998. ó 528 .
2. . . . : / ó : ó 2000, 2005. ó 480 .
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