

论文

MANOVA模型中均值参数的极大极小估计和可容许估计

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摘要:

设 $Y_{(n \times m)}$ 服从矩阵正态分布 $N(X\theta, \sigma^2 \Sigma \times V)$, $X_{(n \times k)}$ 是一个列满秩的矩阵, $n \geq k \geq 3$, σ^2 是未知的, $\sigma^2(-2)S_p$ 服从自由度为 p 的 χ^2 分布。当 $f(t)$ 是单调非降 可微的函数, 且 $0 \leq f(t) \leq 2(k-2)/m(p+2)$ 时, 其列向量为 $\Delta_i(Y) = [I_k - f(V_i' Y' (X' \Sigma^{-1} X)^{-2}) Y V_i S_p^{-1}] S_p (X' \Sigma^{-1} X)^{-1} / V_i' Y' (X' \Sigma^{-1} X)^{-2} Y V_i] (X' \Sigma^{-1} X)^{-1} X' \Sigma^{-1} Y_i$ 的估计 $\Delta(Y)$ 在风险函数 R_1 或 R_2 下是能够改善 θ 的极大似然估计 $(X' \Sigma^{-1} X)^{-1} X' \Sigma^{-1} Y$ 。同时得到了 θ 和 $CX\theta$ 的线性可容许估计类。

关键词: 正态MANOVA模型 极大极小估计 可容许估计

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Minimax Estimation and Admissible Estimation Under Normal MANOVA Model

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Abstract:

Let random matrix $Y_{(n \times m)}$ be distributed according to $N(X\theta, \sigma^2 \Sigma \times V)$, Where X is a known $n \times k$ matrix of rank k , $n \geq k \geq 3$, σ^2 is unknown and $\sigma^2(-2)S_p$ has a χ^2 square distribution with degree of freedom p . When $f(t)$ is differentiable and $f'(t) \geq 0, 0 \leq f(t) \leq 2(k-2)/m(p+2)$, the estimator whose i th column vector has the form $\Delta_i(Y) = [I_k - f(V_i' Y' (X' \Sigma^{-1} X)^{-2}) Y V_i S_p^{-1}] S_p (X' \Sigma^{-1} X)^{-1} / V_i' Y' (X' \Sigma^{-1} X)^{-2} Y V_i] (X' \Sigma^{-1} X)^{-1} X' \Sigma^{-1} Y_i$ where V_i is the i th column vector of $V^{-1/2}$, can improve the maximum likelihood estimator $(X' \Sigma^{-1} X)^{-1} X' \Sigma^{-1} Y$ of θ . Moreover, some classes of admissible linear estimators for θ or $CX\theta$ are obtained too

Keywords: Normal MANOVA model Minimax estimator Admissible estimator

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