No.

Date

1. Σ已知时单个总体均值向量检验.

$H_0: \mu=\mu_0 \qquad H_1: \mu\neq\mu_0 \qquad X_1,\cdots,X_n \overset{i.i.d}{\sim} N(\mu,\Sigma)$.

$$T_0^2 = n(\bar{X}-\mu_0)'\Sigma^{-1}(\bar{X}-\mu_0) \sim \chi^2(p).$$

拒绝域: $C_\alpha=\{T_0^2 \geq \chi^2_\alpha(p)\}$

p值: $p=\inf\{\alpha: T_0^2\in C_\alpha\}$

2. Σ未知时单个总体均值向量检验.

$$T^2=(n-1)n(\bar{X}-\mu_0)'A^{-1}(\bar{X}-\mu_0)\sim T^2(p,n-1).$$

$$X_{n\times p}=\begin{pmatrix}X_1'\\ \vdots\\ X_n'\end{pmatrix}.$$

$$A=\sum_{\alpha=1}^{n}(X_\alpha-\bar{X})(X_\alpha-\bar{X})^T = Var(X_{n\times p})\cdot(n-1).$$

R代码Var函数.

$$F=\frac{(n-p)}{(n-1)p}T^2\sim F(p,n-p).$$

拒绝域: $C_\alpha=\{F\geq F_\alpha(p,n-p)\}$

p值: $p=\inf\{\alpha: \alpha\in C_\alpha\}$.