

At conclusion of adjustment (LS)

23-1

Global Test on Reference Variance

σ_0^2 prior (a priori)

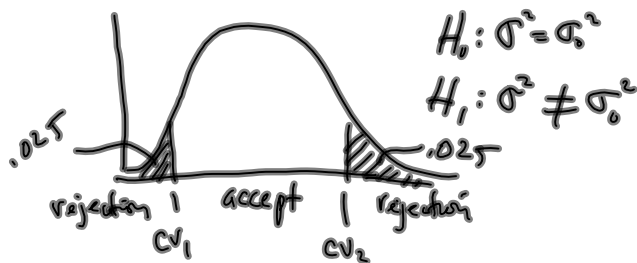
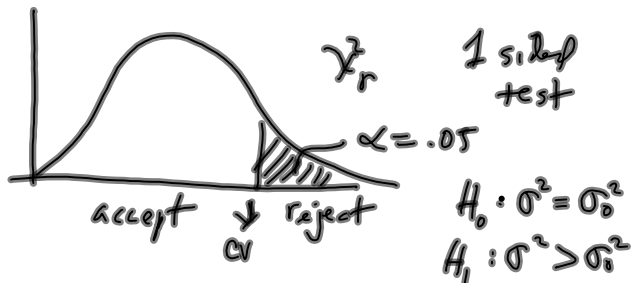
$\hat{\sigma}_0^2$ post (a posteriori)

$\frac{\sqrt{TWV}}{\sigma_0^2} = \chi^2*$ test statistic $\sim \chi_r^2$

same { redundancy ↑
degrees of freedom

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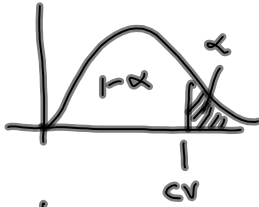


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how to get critical values ?

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table look ups
calculators Norm, t, χ^2 , F
mat lab



icdf:
 $CV = \text{icdf}(\text{'chi2'}, 1-\alpha, r)$



$CV_1 = \text{icdf}(\text{'chi2'}, \alpha/2, r)$

$CV_2 = \text{icdf}(\text{'chi2'}, 1-\alpha/2, r)$

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if accept $H_0 \Rightarrow$ proceed to make
error prop

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confidence interval (1D)

confidence ellipse (2D)

confidence circle (2D)

if reject $H_0 \Rightarrow$?

look at residuals individually, if suspect
then - reobserve, check ID
delete observations

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better configured
for point elimination

fixing model, have the correct model

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calibration target layout

danger: if meas. point in corner
extrapolating using polynomial
expression: badly behaved

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Scale Σ : $\Sigma_{\Delta\Delta} = \Delta_0^2 Q_{\Delta\Delta} \quad t, F \quad 23-7$

last resort if reject

assume pass global test

$$\Sigma_{\Delta\Delta} = \sigma_0^2 Q_{\Delta\Delta} \quad z, \chi^2$$

$$\Sigma_{uv}, \Sigma_{\hat{x}\hat{x}}$$

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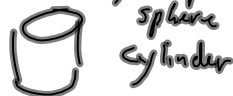
Confidence statements

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1D confidence interval

2D conf. ellipse, circle

3D conf. volume, ellipsoidal



P % confidence interval for μ_x

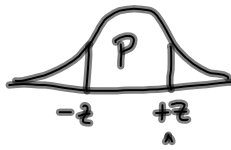
$$z = \frac{\hat{x} - \mu_x}{\sigma}$$

$$\boxed{\hat{x} \pm z \sigma_x}$$

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$$P = F(z) - F(-z)$$

$$F(-z) = 1 - F(z) \quad \uparrow$$

$$P = F(z) - (1 - F(z))$$

$$P = 2F(z) - 1$$

$$F(z) = \frac{P+1}{2}$$

$$z = F^{-1}\left(\frac{P+1}{2}\right) \quad \text{icdf}$$

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$$y = \text{pdf}(\text{name}, x, \text{params})$$

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$$P = \text{cdf}(\text{name}, x, \text{params})$$

$$x = \text{icdf}(\text{name}, P, \text{params})$$

$$\text{name} = \text{'norm', 'chi2', 't', 'f', ...}$$

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2D conf. region

$\begin{bmatrix} \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot \\ \cdot & \cdot & \cdot \end{bmatrix} \begin{matrix} x_1 \\ y_1 \\ x_2 \\ y_2 \end{matrix}$

$S = \begin{bmatrix} \sigma_x^2 & \sigma_{xy} \\ \sigma_{xy} & \sigma_y^2 \end{bmatrix} = \sum_{i=1}^n \mathbf{x}_i \mathbf{x}_i^T$

$[V, D] = \text{eig}(S)$

$\begin{matrix} \rightarrow [\lambda_1 & \lambda_2] \\ \rightarrow [v_1 & v_2] \end{matrix}$

P confidence region

$Ax = \lambda x$
def eigenvalue

directions, orient
axes \vec{E}_1, \vec{E}_2

$a = \sqrt{\lambda_1 \cdot \chi_{p,2}^2}$
 $b = \sqrt{\lambda_2 \cdot \chi_{p,2}^2}$

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confidence circle

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