$\overline{X}=\frac{\sum_{i=1}^n X_i}{n}; S^2=\frac{\sum_{i=1}^n (X_i-\overline{X})^2}{n-1}=\frac{\sum_{i=1}^n X_i^2-n\overline{X}^2}{n-1}; S_p^2=\frac{\sum_{i=1}^2 (n_i-1)S_i^2}{\sum_{i=1}^2(n_i-1)}; P(Z>z_{\alpha/2})=P(T>t_{\alpha/2})=P(T^*>t^*_{\alpha/2})=\alpha/2; Z\sim N(0{,}1); T\sim t_{n-1}; T^*\sim t_{n1+n2-2}$

Intervalo de confiança a $1-\alpha$ % de confiança

$\left[\overline{X}\pm z_{\alpha/2}\frac{\sigma}{\sqrt{n}}\right]$; $\left[\overline{X}\pm t_{\alpha/2,n-1}\frac{s}{\sqrt{n}}\right]$; $\left[\hat{p}\pm z_{\alpha/2}\sqrt{\frac{\hat{p}(1-\hat{p})}{n}}\right]$; $\left[\frac{(n-1)S^2}{\chi^2_{1-\alpha/2,n-1}};\frac{(n-1)S^2}{\chi^2_{\alpha/2,n-1}}\right]$; $\left[\overline{X}_1-\overline{X}_2\pm z_{\alpha/2}\sqrt{\frac{\sigma_1^2}{n_1}+\frac{\sigma_2^2}{n_2}}\right]$; $\left[\overline{X}_1-\overline{X}_2\pm t*_{\alpha/2}\sqrt{\frac{S_p^2}{n_1}+\frac{S_p^2}{n_2}}\right]$; $\left[\hat{p}_1-\hat{p}_2\pm z_{\alpha/2}\sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n_1}+\frac{\hat{p}_2(1-\hat{p}_2)}{n_2}}\right]$

H_0	H_1	Regra de decisão (H_0 é falsa se)	
$\mu=\mu_0$	$\mu\neq\mu_0$	$\overline{X}_{obs}\notin\left[\mu_0\pm z_{\alpha/2}\frac{\sigma}{\sqrt{n}}\right]$ ou $Z_{obs}\notin[-z_{\alpha/2};z_{\alpha/2}]$;	$P(Z>z_{\alpha/2})=\alpha/2$
	$\mu>\mu_0$	$\overline{X}_{obs}\in\left[\mu_0+z_{\alpha}\frac{\sigma}{\sqrt{n}};\infty\right]$ ou $Z_{obs}\in[z_\alpha{,}\infty]$;	$Z_{obs}=\frac{\overline{X}_{obs}-\mu_0}{\sigma\sqrt{n}}$
	$\mu<\mu_0$	$\overline{X}_{obs}\in\left[-\infty;\mu_0-z_{\alpha}\frac{\sigma}{\sqrt{n}}\right]$ ou $Z_{obs}\in[-\infty;-z_\alpha]$;	$Z\sim N(0;1)$
$\mu=\mu_0$	$\mu\neq\mu_0$	$\overline{X}_{obs}\notin\left[\mu_0\pm t_{\alpha/2}\frac{s}{\sqrt{n}}\right]$ ou $t_{obs}\notin[-t_{\alpha/2};t_{\alpha/2}]$;	$P(T>t_{\alpha/2})=\alpha/2$
	$\mu>\mu_0$	$\overline{X}_{obs}\in\left[\mu_0+t_{\alpha}\frac{s}{\sqrt{n}};\infty\right]$ ou $t_{obs}\in[t_\alpha{,}\infty]$;	$t_{obs}=\frac{\overline{X}_{obs}-\mu_0}{s\sqrt{n}}$
	$\mu<\mu_0$	$\overline{X}_{obs}\in\left[-\infty;\mu_0-t_{\alpha}\frac{s}{\sqrt{n}}\right]$ ou $t_{obs}\in[-\infty;-t_\alpha]$;	$T\sim t_{n-1}$

H_0	H_1	Regra de decisão (H_0 é falsa se)	
$p=p_0$	$p\neq p_0$	$\hat{p}_{obs}\notin\left[p_0\pm z_{\alpha/2}\sqrt{\frac{p_0(1-p_0)}{n}}\right]$ ou $Z_{obs}\notin[-z_{\alpha/2};z_{\alpha/2}]$;	$P(Z>z_{\alpha/2})=\alpha/2$
	$p>p_0$	$\hat{p}_{obs}\in\left[p_0+z_{\alpha}\sqrt{\frac{p_0(1-p_0)}{n}};\infty\right]$ ou $Z_{obs}\in[z_\alpha{,}\infty]$;	$Z_{obs}=\frac{\hat{p}-p_0}{\sqrt{\frac{p_0(1-p_0)}{n}}}$
	$p<p_0$	$\hat{p}_{obs}\in\left[-\infty;p_0-z_{\alpha}\sqrt{\frac{p_0(1-p_0)}{n}}\right]$ ou $Z_{obs}\in[-\infty;-z_\alpha]$	$Z\sim N(0;1)$
$\sigma^2=\sigma_0^2$	$\sigma^2\neq\sigma_0^2$	$S^2\notin\left[\frac{\sigma_0^2\chi^2_{\alpha/2}}{n-1};\frac{\sigma_0^2\chi^2_{1-\alpha/2}}{n-1}\right]$ ou $\chi^2_{obs}\notin[\chi^2_{\alpha/2};\chi^2_{1-\alpha/2}]$	$P(\chi^2<\chi^2_{\alpha/2})=\alpha/2$
	$\sigma^2>\sigma_0^2$	$S^2\in\left[\frac{\sigma_0^2\chi^2_{1-\alpha/2}}{n-1};\infty\right]$ ou $\chi^2_{obs}\in[\chi^2_{1-\alpha/2};\infty]$	$\chi^2_{obs}=\frac{(n-1)S^2}{\sigma_0^2}$
	$\sigma^2<\sigma_0^2$	$S^2\in\left]0;\frac{\sigma_0^2\chi^2_{\alpha/2}}{n-1};\right]$ ou $\chi^2_{obs}\in]0;\chi^2_{\alpha/2}]$	$\chi^2\sim\chi^2_{n-1}$

H_0	H_1	Regra de decisão (H_0 é falsa se)	
$\mu_1=\mu_2$	$\mu_1\neq\mu_2$	$\overline{X}_1-\overline{X}_2\notin\left[\pm z_{\alpha/2}\sqrt{\frac{\sigma_1^2}{n_1}+\frac{\sigma_2^2}{n_2}}\right]$ ou $Z_{obs}\notin[\pm z_{\alpha/2}]$;	$P(Z>z_{\alpha/2})=\alpha/2$
	$\mu_1>\mu_2$	$\overline{X}_1-\overline{X}_2\in\left[z_{\alpha}\sqrt{\frac{\sigma_1^2}{n_1}+\frac{\sigma_2^2}{n_2}};\infty\right]$ ou $Z_{obs}\in[z_\alpha{,}\infty]$;	$Z_{obs}=\frac{\overline{X}_1-\overline{X}_2}{\sqrt{\frac{\sigma_1^2}{n_1}+\frac{\sigma_2^2}{n_2}}}$
	$\mu_1<\mu_2$	$\overline{X}_1-\overline{X}_2\in\left[-\infty;-z_{\alpha}\sqrt{\frac{\sigma_1^2}{n_1}+\frac{\sigma_2^2}{n_2}}\right]$ ou $Z_{obs}\in[-\infty;-z_\alpha]$	$Z\sim N(0;1)$
$\mu_1=\mu_2$	$\mu_1\neq\mu_2$	$\overline{X}_1-\overline{X}_2\notin\left[\pm t_{\alpha/2}\sqrt{\frac{s_p^2}{n_1}+\frac{s_2^p}{n_2}}\right]$ ou $t_{obs}\notin[\pm t_{\alpha/2}]$;	$P(T>t_{\alpha/2})=\alpha/2$
	$\mu_1>\mu_2$	$\overline{X}_1-\overline{X}_2\in\left[+t_{\alpha}\sqrt{\frac{s_p^2}{n_1}+\frac{s_p^2}{n_2}};\infty\right]$ ou $t_{obs}\in[t_\alpha{,}\infty]$;	$t_{obs}=\frac{\overline{X}_1-\overline{X}_2}{\sqrt{\frac{s_p^2}{n_1}+\frac{s_p^2}{n_2}}}$
	$\mu_1<\mu_2$	$\overline{X}_1-\overline{X}_2\in\left[-\infty;-t_{\alpha}\sqrt{\frac{s_p^2}{n_1}+\frac{s_p^2}{n_2}}\right]$ ou $t_{obs}\in[-\infty;-t_\alpha]$	$T\sim t_{n_1+n_2-2}$

H_0	H_1	Regra de decisão (H_0 é falsa se)	
$p_1=p_2$	$p_1\neq p_2$	$\hat{p}_1-\hat{p}_2\notin\left[\pm z_{\alpha/2}\sqrt{\frac{\hat{p}(1-\hat{p})}{n_1}+\frac{\hat{p}(1-\hat{p})}{n_2}}\right]$ ou $Z_{obs}\notin[\pm z_{\alpha/2};]$	$P(Z>z_{\alpha/2})=\alpha/2$
	$p_1>p_2$	$\hat{p}_1-\hat{p}_2\in\left[z_{\alpha}\sqrt{\frac{\hat{p}(1-\hat{p})}{n_1}+\frac{\hat{p}(1-\hat{p})}{n_2}};\infty\right]$ ou $Z_{obs}\in[z_\alpha;\infty]$;	$Z_{obs}=\frac{\hat{p}_1-\hat{p}_2}{\sqrt{\frac{\hat{p}(1-\hat{p})}{n_1}+\frac{\hat{p}(1-\hat{p})}{n_2}}}$
	$p_1<p_2$	$\hat{p}_1-\hat{p}_2\in\left[-\infty;z_{\alpha}\sqrt{\frac{\hat{p}(1-\hat{p})}{n_1}+\frac{\hat{p}(1-\hat{p})}{n_2}};\right]$ ou $Z_{obs}\in[-\infty;-z_\alpha;]$;	$\hat{p}=\frac{n_1\hat{p}_1+n_2\hat{p}_2}{n_2+n_2}$
$\sigma_1^2=\sigma_2^2$	$\sigma_1^2\neq\sigma_2^2$	$\frac{S_1^2}{S_2^2}\notin[F_{\alpha/2,n_1-1,n_2-1};F_{1-\alpha/2,n_1-1,n_2-1}]$	$P(F>F_{\alpha/2})=\alpha/2$
	$\sigma_1^2>\sigma_2^2$	$\frac{S_1^2}{S_2^2}\in[F_{1-\alpha,n_1-1,n_2-1},\infty]$	
	$\sigma_1^2<\sigma_2^2$	$\frac{S_1^2}{S_2^2}\in]0;F_{\alpha,n_1-1,n_2-1}]$	$F\sim F_{n-1,n-2}$

Dados Emparelhados: $\overline{D}=\frac{\sum_{i=1}^n D_i}{n}; D_i=X_i-Y_i; S_D^2=\frac{\sum_{i=1}^n(D_i-D)^2}{n-1}; t_{obs}=\overline{D}/\sqrt{S_D^2/n}; P(T>t_{\alpha/2})=\alpha/2; T\sim t_{n-1}$

$H_0:\mu_x=\mu_y$	$H_1:\mu_x\neq\mu_y$	$H_1:\mu_x>\mu_y$	$H_1:\mu_x<\mu_y$
H_0 é falsa se	$\overline{D}\notin[\pm t_{\alpha/2}\sqrt{S_D^2/n}]$ ou $t_{obs}\notin[\pm t_{\alpha/2}]$	$\overline{D}\in\left[t_\alpha\sqrt{S_D^2/n},\infty\right]$ ou $t_{obs}\in[t_{\alpha/2}{,}\infty]$	$\overline{D}\in\left[-\infty,-t_\alpha\sqrt{S_D^2/n}\right]$ ou $t_{obs}\in[-\infty,-t_\alpha]$

ANOVA 1 fator

Modelo $X_{ij}=\mu+\alpha_i+\epsilon_{ij}; i=1,\ldots,k; j=1,\ldots n_i$

FV	SQ	gl	QM	F_{obs}
Entre	$\sum_{i=1}^k n_i(\overline{X}_i-\overline{X})^2$	$k-1$	$S_e^2=\frac{SQEntre}{k-1}$	$\frac{S_e^2}{S_p^2}$
Dentro	$\sum_{i=1}^k\sum_{j=1}^{n_i}(X_{ij}-\overline{X}_i)^2$	$\sum_{i=1}^k(n_i-1)$	$S_p^2=\frac{SQDentro}{\sum_{i=1}^k(n_i-1)}$	
Total	$\sum_{i=1}^k\sum_{j=1}^{n_i}(X_{ij}-\overline{X})^2$	$\sum_{i=1} n_i-1$		

$H_0:\alpha_1=\ldots=\alpha_k=0$; H_0 é falsa se $F_{obs}>F_{\alpha,k-1,\sum_{i=1}^k(n_i-1)}$

ANOVA 2 fatores sem réplica

Modelo $X_{ij}=\mu+\alpha_i+\beta_j+\epsilon_{ij}, i=1,\ldots,a; j=1,\ldots,b$

FV	SQ	gl	QM	F_{obs}
A	$\sum_{i=1}^a b(\overline{X}_i-\overline{X})^2$	$a-1$	$S_A^2=\frac{SQA}{a-1}$	$F_a=\frac{S_A^2}{S_r^2}$
B	$\sum_{j=1}^b a(\overline{X}_j-\overline{X})^2$	$b-1$	$S_B^2=\frac{SQB}{b-1}$	$F_b=\frac{S_b^2}{S_r^2}$
Resíduos	$SQT-SQA-SQB$	$(a-1)(b-1)$	$S_r^2=\frac{SQRes}{(a-1)(b-1)}$	
Total	$\sum_{i=1}^a\sum_{j=1}^b(X_{ij}-\overline{X})^2$	$a\times b-1$		

$H_{01}:\alpha_1=\ldots=\alpha_a=0$; H_{01} é falsa se $F_a>F_{\alpha,a-1,(a-1)(b-1)}$

$H_{02}:\beta_1=\ldots=\beta_b=0$; H_{02} é falsa se $F_b>F_{\alpha,b-1,(a-1)(b-1)}$

ANOVA - Modelo de regressão simples

Modelo $Y_i=\beta_0+\beta_1X_i+\epsilon_i, i=1\ldots,n$

FV	SQ	gl	QM	F_{obs}
Regressão	$\sum_{i=1}^n(\widehat{Y}_i-\overline{Y})^2$	1	$S_{reg}^2=SQReg$	$\frac{S_{reg}^2}{S_{res}^2}$
Resíduo	$\sum_{i=1}^n(Y_i-\widehat{Y})^2$	$n-2$	$S_{res}^2=\frac{SQRes}{n-2}$	
Total	$\sum_{i=1}^n(Y_i-\overline{Y})^2$	$n-1$		

$SQReg=\hat{\beta}_1^2\sum_{i=1}^n(X_i-\overline{X})^2; H_0:\beta_1=0$; H_0 é falsa se $F_{obs}>F_{\alpha,1,n-2}$

$R^2=\frac{SQReg}{SQT}; \widehat{Y}_i=\hat{\beta}_0+\hat{\beta}_1X_i; \hat{\beta}_0=\overline{Y}-\hat{\beta}_1\overline{X}; \hat{\beta}_1=\frac{\sum_{i=1}^n Y_iX_i-n\overline{Y}\overline{X}}{\sum_{i=1}^n(X_i-\overline{X})^2}$

IC: $\hat{\beta}_1\pm t_{\alpha/2,n-2}S_{res}\sqrt{\frac{1}{\sum_{i=1}^n(X_i-\overline{X})^2}}; \hat{\beta}_0\pm t_{\alpha/2,n-2}S_{res}\sqrt{\frac{\sum_{i=1}^n X_i^2}{n\sum_{i=1}^n(X_i-\overline{X})^2}};$

IC para média: $\widehat{Y}_i\pm t_{\alpha/2,n-2}S_{res}\sqrt{\frac{1}{n}+\frac{(X_i-\overline{X})^2}{\sum_{i=1}^n(X_i-\overline{X})^2}};$

IC para futura obs.: $\widehat{Y}_i\pm t_{\alpha/2,n-2}S_{res}\sqrt{1+\frac{1}{n}+\frac{(X_i-\overline{X})^2}{\sum_{i=1}^n(X_i-\overline{X})^2}}$

ANOVA 2 fatores com réplica

Modelo $X_{ijk}=\mu+\alpha_i+\beta_j+\alpha\beta_{ij}+\epsilon_{ijk}, i=1,\ldots,a; j=1,\ldots,b; k=1,\ldots,n$

FV	SQ	gl	QM	F_{obs}
A	$\sum_{i=1}^a bn(\overline{X}_{i.}-\overline{X})^2$	$a-1$	$S_A^2=\frac{SQA}{a-1}$	$F_a=\frac{S_A^2}{S_r^2}$
B	$\sum_{j=1}^b an(\overline{X}_{.j}-\overline{X})^2$	$b-1$	$S_B^2=\frac{SQB}{b-1}$	$F_b=\frac{S_b^2}{S_r^2}$
AB	$SQT-SQA-SQB-SQRes$	$(a-1)(b-1)$	$S_{AB}^2=\frac{SQAB}{(a-1)(b-1)}$	$F_{ab}=\frac{S_{ab}^2}{S_r^2}$
Resíduos	$\sum_{i=1}^a\sum_{j=1}^b(n-1)s_{ij}^2$	$ab(n-1)$	$S_r^2=\frac{SQRes}{ab(n-1)}$	
Total	$\sum_{i=1}^a\sum_{j=1}^b\sum_{k=1}^n(X_{ijk}-\overline{X})^2$	$a\times b\times n-1$		

$\overline{X}_{ij}=\sum_{k=1}^n\frac{X_{ijk}}{n}; \overline{X}_{i.}=\frac{\sum_{j=1}^b\overline{X}_{ij}}{b}; \overline{X}_{.j}=\frac{\sum_{i=1}\overline{X}_{ij}}{a}; \overline{X}=\frac{\sum_{i=1}^a\sum_{j=1}^b\overline{X}_{ij}}{ab}$

$H_{01}:\alpha_1=\ldots=\alpha_a=0$; H_{01} é falsa se $F_a>F_{\alpha,a-1,ab(n-1)}$

$H_{02}:\beta_1=\ldots=\beta_b=0$; H_{02} é falsa se $F_b>F_{\alpha,b-1,ab(n-1)}$

$H_{03}:\alpha\beta_{11}=\ldots=\alpha\beta_{ab}=0$; H_{02} é falsa se $F_{ab}>F_{\alpha,(a-1)(b-1),ab(n-1)}$

ANOVA - Modelo de regressão com 2 v auxiliares

Modelo $Y_i=\beta_0+\beta_1X_{1i}+\beta_2X_{2i}+\epsilon_i, i=1\ldots,n$

FV	SQ	gl	QM	F_{obs}
Regressão	$\sum_{i=1}^n(\widehat{Y}_i-\overline{Y})^2$	2	$S_{reg}^2=SQReg/2$	$\frac{S_{reg}^2}{S_{res}^2}$
Resíduo	$\sum_{i=1}^n(Y_i-\widehat{Y})^2$	$n-3$	$S_{res}^2=\frac{SQRes}{n-3}$	
Total	$\sum_{i=1}^n(Y_i-\overline{Y})^2$	$n-1$		

$H_0:\beta_1=\beta_2=0$; H_0 é falsa se $F_{obs}>F_{\alpha,2,n-3}$

Teste de melhoria - Teste do F-parcial

M_1: $Y_i=\beta_0+\beta_1X_{1i}+\epsilon_i\rightarrow SQReg_1$; $H_0:\beta_1=0$ é falsa

M_2: $Y_i=\beta_0+\beta_1X_{1i}+\beta_2X_{2i}+\epsilon_i\rightarrow SQReg_2; S^2_{res_2}$; $H_0:\beta_1=\beta_2=0$ é falsa

$H_0:\beta_2=0|\beta_1\neq0$; H_0 é falsa se $F_{parcial}=\frac{SQReg_2-SQReg_1}{S^2_{res_2}}>F_{\alpha,1,n-3}$

Teste de aderência H_0: os dados seguem uma específica $f(X)$

H_0 é falsa se $\chi^2_{obs}=\sum_{i=1}^k\frac{(O_i-E_i)^2}{E_i}>\chi^2_{\alpha,k-1-p}$, $k,\#$ de classes com $E_i>5,\forall i$, $p,\#$ parâmetros estimados

Teste de associação H_0: não existe associação entre linhas e colunas

H_0 é falsa se $\chi^2_{obs}=\sum_{i=1}^k\sum_{j=1}^c\frac{(O_{ij}-E_{ij})^2}{E_{ij}}>\chi^2_{\alpha,(k-1)(c-1)}$, $k,\#$ de linhas $c,\#$ de colunas com $E_{ij}>5,\forall i,j$