UNIVERSIDAD PERUANA DE CIENCIAS APLICADAS (UPC)
MODALIDAD PREGRADO

FÓRMULAS Y TABLAS PARA LOS CURSOS DE ESTADÍSTICA

Nombre y apellidos ----------

FÓRMULAS ESTADÍSTICAS

MEDIDAS DESCRIPTIVAS

Resumen	Muestra			Población		
Promedio o media aritmética	$\bar{x} = \frac{\sum_{i=1}^{n} x_i}{n}$ Datos sin agrupar	$\bar{x} = \frac{\sum_{i=1}^{k} f_i x_i}{n}$ Datos agrupados	$\bar{x} = \frac{\sum_{i=1}^{k} f_i x_i'}{n}$ Datos agrupados en intervalos	$\mu = \frac{\sum_{i=1}^{N} x_i}{N}$ Datos sin agrupar	$\mu = \frac{\sum_{i=1}^{k} f_i x_i}{N}$ Datos agrupados	$\mu = \frac{\sum_{i=1}^{k} f_i x_i'}{N}$ Datos agrupados en intervalos
Promedio ponderado	$\bar{x}_w = \frac{\sum_{i=1}^{k} w_i x_i}{\sum_{i=1}^{k} w_i}$ donde: w_i representa el peso o ponderación			$\mu_w = \frac{\sum_{i=1}^{k} w_i x_i}{\sum_{i=1}^{k} w_i}$		
Promedio geométrico	$MG = \sqrt[n]{f_1 . f_2 . f_3 \dots f_n}$ Factor de variación: $f_i = \frac{x_i}{x_{i-1}}$; Tasa de variación: $i_i = (f_i - 1).\ 100\%$ Tasa de variación promedio: $i_p = (f_p - 1)\ .\ 100\%$			$MG = \sqrt[N]{f_1 . f_2 . f_3 \dots f_N}$ Factor de variación: $f_i = \frac{x_i}{x_{i-1}}$; Tasa de variación: $i_i = (f_i - 1).\ 100\%$ Tasa de variación promedio: $i_p = (f_p - 1).\ 100\%$		
Mediana	Datos sin agrupar: "n impar": $Me = X_{\frac{n+1}{2}}$ "n par": $Me = \frac{X_{\frac{n}{2}} + X_{\frac{n}{2}+1}}{2}$ Otra forma: Si la posición i = 0,5(n) tiene decimales: Tomar como valor de la Me el dato de la posición inmediata superior a: i = 0,5(n) Si la posición i = 0,5(n) es un número entero: $Me = \frac{X_i + X_{i+1}}{2}$ Datos agrupados en intervalos: $Me = L_{me} + \frac{w}{f_{me}}\left(\frac{n}{2} - F_{me-1}\right)$			Datos sin agrupar: "N impar": $Me = X_{\frac{N+1}{2}}$ "N par": $Me = \frac{X_{\frac{N}{2}} + X_{\frac{N}{2}+1}}{2}$ Otra forma: Si la posición i = 0,5(N) tiene decimales: Tomar como valor de la Me el dato de la posición inmediata superior a: i = 0,5(N) Si la posición i = 0,5(N) es un número entero: $Me = \frac{X_i + X_{i+1}}{2}$ Datos agrupados en intervalos: $Me = L_{me} + \frac{w}{f_{me}}\left(\frac{N}{2} - F_{me-1}\right)$		
Moda	$Mo = L_{mo} + \left(\frac{d_1}{d_1 + d_2}\right)w$ donde $d_1 = f_i - f_{i-1}$, $d_2 = f_i - f_{i+1}$			$Mo = L_{mo} + \left(\frac{d_1}{d_1 + d_2}\right)w$ donde: $d_1 = f_i - f_{i-1}$, $d_2 = f_i - f_{i+1}$		
Varianza	$S^2 = \frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1}$ Datos sin agrupar	$S^2 = \frac{\sum_{i=1}^{k} f_i (x_i - \bar{x})^2}{n-1}$ Datos agrupados	$s^2 = \frac{\sum_{i=1}^{k} f_i (x_i' - \bar{x})^2}{n-1}$ Datos agrupados en intervalos	$\sigma^2 = \frac{\sum_{i=1}^{N}(x_i - \mu)^2}{N}$ Datos sin agrupar	$\sigma^2 = \frac{\sum_{i=1}^{k} f_i (x_i - \mu)^2}{N}$ Datos agrupados	$\sigma^2 = \frac{\sum_{i=1}^{k} f_i (x_i' - \mu)^2}{N}$ Datos agrupados en intervalos

Resumen	Muestra			Población		
Desviación estándar	$s=\sqrt{\frac{\sum_{i=1}^{n}(x_i-\bar{x})^2}{n-1}}$	$s=\sqrt{\frac{\sum_{i=1}^{k}f_i(x_i-\bar{x})^2}{n-1}}$	$s=\sqrt{\frac{\sum_{i=1}^{k}f_i(x_i'-\bar{x})^2}{n-1}}$	$\sigma=\sqrt{\frac{\sum_{i=1}^{N}(x_i-\mu)^2}{N}}$	$\sigma=\sqrt{\frac{\sum_{i=1}^{k}f_i(x_i-\mu)^2}{N}}$	$\sigma=\sqrt{\frac{\sum_{i=1}^{k}f_i(x_i'-\mu)^2}{N}}$
Coeficiente de variación	$CV=\left(\frac{s}{\bar{x}}\right)x100\%$			$CV=\left(\frac{\sigma}{\mu}\right)x100\%$		

	Datos sin agrupar		Datos agrupados en intervalos
Percentiles	Posición del percentil $i=\frac{k(n+1)}{100}=E,d$ E: parte entera d: parte decimal Cálculo del percentil $P_k=X_{(E)}+(0,d)[X_{(E+1)}-X_{(E)}]$ E: parte entera d: parte decimal	Cálculo del percentil Otra forma: Si la posición i = (k*n)/100 tiene decimales: Tomar como valor del P_k el dato de la posición inmediata superior a: i = (k*n)/100 Si la posición i = (k*n)/100 es un número entero: $P_k=\frac{X_i+X_{i+1}}{2}$	$P_k=L_i+\frac{w}{f_i}\left(\frac{n.k}{100}-F_{i-1}\right)$
RIC	$RIC=P_{75}-P_{25}$		

Organización de datos cuantitativos continuos	Rango= Obs.máx. – Obs.mín. Regla de Sturges: $k=1+3.322\log_{10}n$ $w=\frac{R}{K}$

DISTRIBUCIONES DE PROBABILIDAD				
Bernoulli	$X \sim B(1,p)$	$P(X=x)=p^x(1-p)^{1-x} \quad x=0,1$	$E(X)=p$	$V(X)=p(1-p)$
Binomial	$X \sim B(n,p)$	$P(X=x)=C_x^n p^x(1-p)^{n-x} \quad x=0,1,\dots,n$	$E(X)=np$	$V(X)=np(1-p)$
Hipergeométrica	$X \sim H(N,r,n)$	$P(X=x)=\frac{C_x^r C_{n-x}^{N-r}}{C_n^N} \quad x=0,1,\dots,\min(r,n)$	$E(X)=n\left(\frac{r}{N}\right)$	$V(X)=n\left(\frac{r}{N}\right)\left(1-\frac{r}{N}\right)\left(\frac{N-n}{N-1}\right)$
Poisson	$X \sim P(\lambda)$	$P(X=x)=\frac{e^{-\lambda}.\lambda^x}{x!} \quad x=0,1,2,\dots$	$E(X)=\lambda$	$V(X)=\lambda$
Geométrica	$X \sim G(p)$	$P(X=x)=p(1-p)^{x-1} \quad x=1,2,3,\dots$	$E(X)=\frac{1}{p}$	$V(X)=\frac{1-p}{p^2}$
Pascal	$X \sim BN(k,p)$	$P(X=x)=C_{k-1}^{x-1}p^k(1-p)^{x-k} \quad x=k,k+1,k+2,\dots$	$E(X)=\frac{k}{p}$	$V(X)=\frac{k(1-p)}{p^2}$
Normal	$X \sim N(\mu,\sigma^2)$	$f(x)=\frac{1}{\sqrt{2\pi}\sigma}e^{-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2}, \quad -\infty<x<\infty$	$E(X)=\mu$	$V(X)=\sigma^2$
Uniforme	$X \sim U[a,b]$	$f(x)=\frac{1}{b-a}, \quad a\le x\le b$	$E(X)=\frac{(a+b)}{2}$	$V(X)=\frac{(b-a)^2}{12}$
Gamma	$X \sim Ga(\alpha,1/\beta)$	$f(x)=\frac{1}{\beta^\alpha\Gamma(\alpha)}x^{\alpha-1}e^{-\frac{x}{\beta}}$, $x>0$, cuando $\propto>0$,$\beta>0$ $\Gamma(\alpha)=\int_0^\infty x^{\alpha-1}e^{-x}dx, \ \alpha>0$ $\quad \Gamma(n)=(n-1)!$	$E(X)=\alpha\beta$	$V(X)=\alpha\beta^2$
Exponencial	$X \sim E(1/\beta)$	$f(x)=\frac{1}{\beta}e^{-\frac{x}{\beta}}$, $x>0$, donde $\beta>0$ Función acumulada: $F(x)=P(X\le x)=1-e^{-\frac{x}{\beta}}$	$E(X)=\beta$	$V(X)=\beta^2$

ESTIMACIÓN Y PRUEBA DE HIPOTESIS

Parámetro	Intervalos de Confianza		Estadístico de Prueba
μ	Varianza conocida	Varianza desconocida	$z = \frac{\bar{x}-\mu}{\sigma/\sqrt{n}} \sim N(0,1)$ $\quad t = \frac{\bar{x}-\mu}{S/\sqrt{n}} \sim t_{(n-1)}$
	$IC(\mu) = \bar{x} \pm z_{1-\alpha/2}\frac{\sigma}{\sqrt{n}}$	$IC(\mu) = \bar{x} \pm t_{(\frac{\alpha}{2},\ n-1)}\frac{s}{\sqrt{n}}$	
σ^2	$LIC(\sigma^2) = \frac{(n-1)s^2}{\chi^2_{(\frac{\alpha}{2},n-1)}}$	$LSC(\sigma^2) = \frac{(n-1)s^2}{\chi^2_{(1-\frac{\alpha}{2},n-1)}}$	$\chi^2 = \frac{(n-1)S^2}{\sigma^2} \sim X^2_{(n-1)}$
p	$IC(p) = \hat{p} \pm z_{(1-\alpha/2)}\sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$ $\quad \hat{q} = 1-\hat{p}$		$z = \frac{\hat{p}-p}{\sqrt{\frac{p(1-p)}{n}}} \sim N(0,1)$
$\mu_1 - \mu_2$ Muestras independientes	Varianzas conocidas		
	$IC(\mu_1-\mu_2) = (\bar{x}_1-\bar{x}_2) \pm z_{(1-\alpha/2)}\sqrt{\frac{\sigma_1^2}{n_1}+\frac{\sigma_2^2}{n_2}}$		$z = \frac{(\bar{x}_1-\bar{x}_2)-(\mu_1-\mu_2)}{\sqrt{\frac{\sigma_1^2}{n_1}+\frac{\sigma_2^2}{n_2}}} \sim N(0,1)$
	Varianzas desconocidas pero iguales (homogéneas)		
	$IC(\mu_1-\mu_2) = (\bar{x}_1-\bar{x}_2) \pm t_{(\frac{\alpha}{2},\ n_1+n_2-2)}\sqrt{S_p^2\left(\frac{1}{n_1}+\frac{1}{n_2}\right)}$ donde: $S_p^2 = \frac{(n_1-1)S_1^2+(n_2-1)S_2^2}{n_1+n_2-2}$ Grados de libertad (g.l.) = $n_1 + n_2 - 2$		$t = \frac{(\bar{x}_1-\bar{x}_2)-(\mu_1-\mu_2)}{\sqrt{S_p^2\left(\frac{1}{n_1}+\frac{1}{n_2}\right)}} \sim t_{(n_1+n_2-2)}$ *donde* $S_p^2 = \frac{(n_1-1)S_1^2+(n_2-1)S_2^2}{n_1+n_2-2}$
	Varianzas desconocidas y diferentes (heterogéneas)		
	$IC(\mu_1-\mu_2) = (\bar{x}_1-\bar{x}_2) \pm t_{(\frac{\alpha}{2},\ v)}\sqrt{\frac{S_1^2}{n_1}+\frac{S_2^2}{n_2}}$ Grados de libertad (g.l.) = v, donde $v = \frac{\left(\frac{S_1^2}{n_1}+\frac{S_2^2}{n_2}\right)^2}{\frac{\left(\frac{S_1^2}{n_1}\right)^2}{n_1-1}+\frac{\left(\frac{S_2^2}{n_2}\right)^2}{n_2-1}}$ "v" valor truncado, sin decimales		$t = \frac{(\bar{x}_1-\bar{x}_2)-(\mu_1-\mu_2)}{\sqrt{\frac{S_1^2}{n_1}+\frac{S_2^2}{n_2}}} \sim t_{(v)}$ $\quad v = \frac{\left(\frac{S_1^2}{n_1}+\frac{S_2^2}{n_2}\right)^2}{\frac{\left(\frac{S_1^2}{n_1}\right)^2}{n_1-1}+\frac{\left(\frac{S_2^2}{n_2}\right)^2}{n_2-1}}$ "v" valor truncado, sin decimales

μ_d Muestras relacionadas	$IC(\mu_d) = \bar{d} \pm t_{(n-1,\alpha/2)} \frac{s_d}{\sqrt{n}}$ $\bar{d} = \frac{\sum_{i=1}^{n} d_i}{n} \quad s_d = \sqrt{\frac{\sum_{i=1}^{n} (d_i - \bar{d})^2}{n-1}}$	$t = \frac{\bar{d} - \mu_d}{S_d / \sqrt{n}} \sim t_{(n-1)}$ donde: $d_i = x_{1i} - x_{2i}$; $\mu_d = \mu_1 - \mu_2$ $\bar{d} = \frac{\sum_{i=1}^{n} d_i}{n} \quad s_d = \sqrt{\frac{\sum_{i=1}^{n} (d_i - \bar{d})^2}{n-1}}$

Parámetro	Intervalos de Confianza	Estadístico de Prueba	
σ_1^2 / σ_2^2	$LIC(\sigma_1^2/\sigma_2^2) = \frac{S_1^2}{S_2^2} \cdot \frac{1}{f_{(\alpha/2, v_1, v_2)}}$ $LSC(\sigma_1^2/\sigma_2^2) = \frac{S_1^2}{S_2^2} . f_{(\alpha/2, v_2, v_1)}$ $v_1 = n_1 - 1 \quad v_2 = n_2 - 1$	$F = \frac{S_1^2}{S_2^2} \bullet \frac{1}{\frac{\sigma_1^2}{\sigma_2^2}} \sim F_{(n_1-1, n_2-1)}$ Grados de libertad: $v_1 = n_1 - 1 \quad v_2 = n_2 - 1$	
$\boldsymbol{p_1 - p_2}$	$LIC(p_1 - p_2) = (\hat{p}_1 - \hat{p}_2) - z_{1-\alpha/2} \sqrt{\frac{\hat{p}_1\hat{q}_1}{n_1} + \frac{\hat{p}_2\hat{q}_2}{n_2}}$ $LSC(p_1 - p_2) = (\hat{p}_1 - \hat{p}_2) + z_{1-\alpha/2} \sqrt{\frac{\hat{p}_1\hat{q}_1}{n_1} + \frac{\hat{p}_2\hat{q}_2}{n_2}}$ donde: $\hat{q}_1 = 1 - \hat{p}_1$ $\hat{q}_2 = 1 - \hat{p}_2$	**a)** $H_0 : p_1 - p_2 = 0$ $z = \frac{\hat{p}_1 - \hat{p}_2}{\sqrt{\bar{p}(1-\bar{p})\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}} \sim N(0,1)$ donde $\bar{p} = \frac{n_1\hat{p}_1 + n_2\hat{p}_2}{n_1 + n_2}$	**b)** $H_0 : p_1 - p_2 = K$ y $K \neq 0$ $z = \frac{(\hat{p}_1 - \hat{p}_2) - K}{\sqrt{\frac{\hat{p}_1\hat{q}_1}{n_1} + \frac{\hat{p}_2\hat{q}_2}{n_2}}} \sim N(0,1)$

Valores críticos para una prueba de hipótesis unilateral de una varianza	
Cálculo del valor crítico "Cola izquierda"	Cálculo del valor crítico "Cola derecha"
$\boldsymbol{\chi^2_{Crit-Izq} = \chi^2_{tab}(1-\alpha, n-1)}$	$\boldsymbol{\chi^2_{Crit-Izq} = \chi^2_{tab}(\alpha, n-1)}$

Valores críticos para una prueba de hipótesis bilateral para el cociente de varianzas	
Cálculo del valor crítico izquierda	Cálculo del valor crítico derecha
$F_{Crit-izq} = \frac{1}{F_{tab}[\frac{\alpha}{2}, (n_2-1); (n_1-1)]}$	$F_{Crit-der} = F_{tab}[\frac{\alpha}{2}, (n_1-1); (n_2-1)]$

CÁLCULO DEL TAMAÑO DE MUESTRA
$n = \left(\frac{z_{1-\alpha/2}\sigma}{e}\right)^2$ $n = \left(\frac{Z_{1-\alpha/2}S}{e}\right)^2$ $\boldsymbol{n = \frac{z^2_{1-\alpha/2}\hat{p}*\hat{q}}{e^2}}$ $n_o = \frac{n}{1+\frac{n}{N}}$ donde n_o = n corregido
$\boldsymbol{\hat{q} = 1 - \hat{p}}$

PRUEBA JI CUADRADO		

$X^2 = \sum_{i=1}^{k} \frac{(o_i - e_i)^2}{e_i} \sim X^2_{[(r-1)(c-1),\alpha]}$	Frecuencia observada: o_{ij}
	Frecuencia esperado: e_{ij}
	$\boldsymbol{e_{ij} = \frac{total\ fila * total\ columna}{total\ general}}$
		$\boldsymbol{X^2 = \sum_{i=1}^{k} \frac{(o_i - e_i)^2}{e_i} \sim X^2_{(\alpha;v)}}$
		$\boldsymbol{donde: v = (k-m-1)\ g.l.}$
		k = # de clases,
		m = # parámetros desconocidos

ANÁLISIS DE REGRESIÓN

Coeficientes de la ecuación $\hat{y} = \hat{\beta}_0 + \hat{\beta}_1 x$:

$$\hat{\beta}_1 = \frac{n\left(\sum_{i=1}^{n} x_i y_i\right) - \left(\sum_{i=1}^{n} x_i\right)\left(\sum_{i=1}^{n} y_i\right)}{n\left(\sum_{i=1}^{n} x_i^2\right) - \left(\sum_{i=1}^{n} x_i\right)^2}$$

$$\hat{\beta}_0 = \bar{y} - \hat{\beta}_1 \bar{x}$$

Coeficiente de correlación:

$$r = \frac{\text{cov}(X,Y)}{S_x' . S_y'} = \frac{\frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\frac{1}{n}\sum_{i=1}^{n}(x_i - \bar{x})^2}.\sqrt{\frac{1}{n}\sum_{i=1}^{n}(y_i - \bar{y})^2}}$$

Suma de cuadrados:

$$SCE = SCT - SCR$$

$$SCT = \sum y_i^2 - \frac{(\sum y_i)^2}{n}$$

$$SCR = \hat{\beta}_1^2\left(\sum x_i^2 - \frac{(\sum x_i)^2}{n}\right)$$

Coeficiente de determinación:

$$r^2 = \frac{SCR}{SCT}$$

Coeficiente de determinación corregido:

$$r^2_{correg.} = \hat{r}^2 = 1 - (1 - r^2)\left(\frac{n-1}{n-p}\right)$$

Cuadrados medios:

$$CMR = \frac{SCR}{p-1} \quad CME = \frac{SCE}{n-p}$$

donde:
p: Nro. de parámetros a estimar (p = k + 1)
k: Nro. de variables independientes

Prueba conjunta:

$$F = \frac{CMR}{CME} \sim F_{(\alpha, p-1, n-p)}$$

Inferencia para β_1:

$$\hat{\beta}_1 \pm t_{\alpha/2, n-2}\frac{s}{\sqrt{S_{xx}}}$$

$$t = \frac{\frac{\hat{\beta}_1 - \beta_1}{s}}{\sqrt{S_{xx}}} = \frac{\hat{\beta}_1 - \beta_1}{S_{b_1}} \sim t_{(n-p)}$$

donde:

$$S_{xx} = \sum x_i^2 - \frac{(\sum x_i)^2}{n} = \sum (x_i - \bar{x})^2$$

$$S_{xx} = \frac{SCR}{\hat{\beta}_1^{\,2}} = (n-1)S_x^2$$

$$s = \sqrt{\frac{SCE}{n-p}} = \sqrt{CME}$$

Nota: "s" también se denota por s_e o $s_{y.x}$

Inferencia para β_0:

$$\hat{\beta}_0 \pm t_{\alpha/2} s\sqrt{\frac{\sum x_i^2}{nS_{xx}}} \qquad t = \frac{\hat{\beta}_0 - \beta_0}{s\sqrt{\frac{\sum x_i^2}{nS_{xx}}}} \sim t_{(n-2)}$$

Prueba de hipótesis para el coeficiente de correlación lineal:

a) $H_0 : \rho = 0$

$$t = \frac{r\sqrt{n-2}}{\sqrt{1-r^2}} \sim t_{(n-2)}$$

b) $H_0 : \rho = \rho_0$ (donde ρ_0 toma un valor diferente de cero)

$$Z = \frac{\sqrt{n-3}}{2} ln\left[\frac{(1+r)(1-\rho_0)}{(1-r)(1+\rho_0)}\right] \sim N(0,1)$$

Pronósticos:

Valor medio

$$\hat{y}_0 \pm t_{(\alpha/2, n-2)} s\sqrt{\frac{1}{n} + \frac{(x_0 - \bar{x})^2}{S_{xx}}} \quad \hat{y}_0 = \hat{\beta}_0 + \hat{\beta}_1(x_0)$$

Valor individual

$$\hat{y}_0 \pm t_{(\alpha/2, n-2)} s\sqrt{1 + \frac{1}{n} + \frac{(x_0 - \bar{x})^2}{S_{xx}}}$$

ANÁLISIS DE REGRESIÓN NO LINEAL		
Modelo	Expresión no lineal	Expresión linealizada
Potencia	$\hat{y} = \hat{\beta}_0 x^{\widehat{\beta_1}}$	$\widehat{Lny} = \widehat{Ln\beta_0} + \hat{\beta}_1 Lnx$
Exponencial	$\hat{y} = \hat{\beta}_0 e^{\widehat{\beta}_1 x}$	$\widehat{Lny} = \widehat{Ln\beta_0} + \hat{\beta}_1 x$
Polinomio de grado m	$\hat{y} = \hat{\beta}_0 + \hat{\beta}_1 x + \hat{\beta}_2 x^2 + \ldots + \hat{\beta}_m x^m$	

INTERVALOS DE PRONÓSTICO PARA LOS MODELOS EXPONENCIAL Y POTENCIA		
Pronóstico	Modelo Exponencial	Modelo Potencia
Para un valor medio	$Ln(\hat{Y}_0) \mp t_{\left(\frac{\alpha}{2};n-2\right)} s \sqrt{\frac{1}{n} + \frac{(x_0 - \bar{x})^2}{S_{XX}}}$	$Ln(\hat{Y}_0) \mp t_{\left(\frac{\alpha}{2};n-2\right)} s \sqrt{\frac{1}{n} + \frac{(Ln(x_0) - \overline{Ln(x)})^2}{S_{XX}}}$
Para un valor individual	$Ln(\hat{Y}_0) \mp t_{\left(\frac{\alpha}{2};n-2\right)} s \sqrt{1 + \frac{1}{n} + \frac{(x_0 - \bar{x})^2}{S_{XX}}}$	$Ln(\hat{Y}_0) \mp t_{\left(\frac{\alpha}{2};n-2\right)} s \sqrt{1 + \frac{1}{n} + \frac{(Ln(x_0) - \overline{Ln(x)})^2}{S_{XX}}}$

DISEÑO DE UN FACTOR (DCA)					
Fuente de variación	Grados de libertad	Suma de cuadrados	Cuadrado medio	F_{Cal}	F_{tab}
Tratamientos	k – 1	$SC(Tr) = \sum_{i=1}^{k} \frac{y_{i.}^2}{n_i} - \frac{y_{..}^2}{n_\bullet}$	$CM(Tr) = \frac{SC(Tr)}{k-1}$	$F = \frac{CM(Tr)}{CME}$	$F_{(\alpha,(k-1),(n.-1))}$
Error	n. – k	$SCE = SCT - SC(Tr)$	$CME = \frac{SCE}{n_\bullet - k}$		
Total	n. – 1 donde$(n_\bullet = \sum_{i=1}^{k} n_i)$	$SCT = \sum_{i=1}^{k}\sum_{j=1}^{n} y_{ij}^2 - \frac{y_{..}^2}{n_\bullet}$			

k: N° tratamientos

Prueba de diferencia de medias según Tukey
Se plantea las siguientes hipótesis:
H_0 : $\mu_i = \mu_j$
H_1 : $\mu_i \neq \mu_j$ $\forall$ i ≠ j

DISEÑO DE BLOQUES AL AZAR (DBCA)					
Fuente de variación	Grados de libertad	Suma de cuadrados	Cuadrado medio	F_{cal}	F_{tab}
Tratamientos	a - 1	$SC(Tr) = \sum_{i=1}^{a} \frac{y_{i.}^2}{b} - \frac{y_{..}^2}{ab}$	$CM(Tr) = \frac{SC(Tr)}{a-1}$	$F_T = \frac{CM(Tr)}{CME}$	$F_{[\alpha,(a-1),(a-1)(b-1)]}$
Bloques	b - 1	$SCB = \sum_{j=1}^{b} \frac{y_{.j}^2}{a} - \frac{y_{..}^2}{ab}$	$CMB = \frac{SCB}{b-1}$	$F_B = \frac{CMB}{CME}$	$F_{[\alpha,(b-1),(a-1)(b-1)]}$
Error	(a - 1)(b - 1)	$SCE = SCT - SC(Tr) - SCB$	$CME = \frac{SCE}{(a-1)(b-1)}$		
Total	ab - 1	$SCT = \sum_{i=1}^{a}\sum_{j=1}^{b} y_{ij}^2 - \frac{y_{..}^2}{ab}$			

a: N° tratamientos
b: N° bloques

DISEÑO FACTORIAL (AxB)					
Fuente de variación	Grados de libertad	Suma de cuadrados	Cuadrado medio	F_c	F_{tab}
Factor A	a - 1	$SCA = \frac{1}{bn}\sum_{i=1}^{a} y_{i..}^2 - \frac{y_{...}^2}{abn}$	$\frac{SCA}{a-1}$	$\frac{CMA}{CME}$	$F_{[a-1,ab(n-1),\alpha]}$
Factor B	b - 1	$SCB = \frac{1}{an}\sum_{j=1}^{b} y_{.j.}^2 - \frac{y_{...}^2}{abn}$	$\frac{SCB}{b-1}$	$\frac{CMB}{CME}$	$F_{[b-1,ab(n-1),\alpha]}$
Interaction AxB	(a - 1)(b - 1)	$SC_{subtotales} = \frac{1}{n}\sum_{i=1}^{a}\sum_{j=1}^{b} y_{ij.}^2 - \frac{y_{...}^2}{abn}$ $SCAB = SC_{subtotales} - SCA - SCB$	$\frac{SCAB}{(a-1)(b-1)}$	$\frac{CMAB}{CME}$	$F_{[(a-1)(b-1),ab(n-1),\alpha]}$
Error	ab(n - 1)	$SCE = SCT - SCA - SCB - SCAB$	$\frac{SCE}{ab(n-1)}$		
Total	abn - 1	$SCT = \sum_{i=1}^{a}\sum_{j=1}^{b}\sum_{k=1}^{n} y_{ijk}^2 - \frac{y_{...}^2}{abn}$			

SERIES DE TIEMPO	
Modelo de suavización exponencial	$\hat{Y}_{t+1} = \alpha Y_t + (1-\alpha)\hat{Y}_t$ El primer valor: $\hat{Y}_1 = Y_1$
Error	$e_t = Y_t - \hat{Y}_t$
Desviación Absoluta de la Media	$DAM = \frac{\sum_{t=1}^{n} \lvert Y_t - \hat{Y} \rvert}{n}$
Porcentaje de Error Medio Absoluto	$PEMA = \frac{\sum_{t=1}^{n} \frac{\lvert Y_t - \hat{Y} \rvert}{Y_t}}{n}$
Error Medio Cuadrado	$EMC = \frac{\sum_{t=1}^{n} (Y_t - \hat{Y})^2}{n}$
Porcentaje Medio del Error	$PME = \frac{\sum_{t=1}^{n} \frac{(Y_t - \hat{Y})}{Y_t}}{n}$

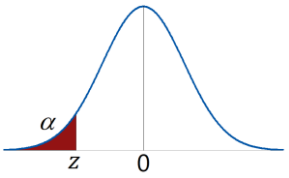
TABLAS ESTADÍSTICAS

Tabla N°1
TABLA DE NÚMEROS ALEATORIOS

C_1	C_2	C_3	C_4	C_5	C_6	C_7	C_8	C_9	C_{10}	C_{11}	C_{12}	C_{13}	C_{14}	C_{15}	C_{16}	C_{17}	C_{18}	C_{19}	C_{20}
4	8	2	4	6	6	3	5	4	5	6	0	5	2	6	9	8	0	0	9
9	2	9	8	1	4	4	1	9	8	5	1	1	9	7	9	8	5	9	0
0	2	1	3	3	9	1	6	2	9	7	1	2	6	6	0	7	5	6	4
9	6	0	8	3	5	6	6	6	4	0	8	6	3	4	8	1	8	5	4
1	6	4	1	6	5	2	7	7	2	9	9	9	9	7	4	1	5	4	9
2	9	0	5	5	0	8	4	8	7	4	6	2	1	7	0	1	5	8	7
6	1	2	9	5	0	4	0	9	8	2	0	2	6	8	7	0	1	9	7
1	3	1	8	9	9	0	1	2	6	3	7	1	9	6	1	7	9	9	8
4	5	8	1	1	4	5	6	7	9	9	9	2	1	3	2	3	7	7	9
0	0	3	6	9	6	5	0	6	4	7	9	8	1	2	4	4	8	3	6
7	2	4	5	4	1	2	4	4	6	9	2	6	6	6	5	2	0	0	4
4	9	3	4	4	2	4	5	9	0	8	7	4	8	4	2	1	2	5	4
6	1	2	8	1	3	3	2	0	2	6	0	7	2	7	9	1	4	6	5
9	3	4	0	8	1	3	3	7	3	2	4	8	6	7	9	0	6	2	8
1	8	7	1	3	4	3	9	3	1	7	8	3	7	3	3	0	8	3	5
0	2	1	4	7	5	7	3	1	1	9	3	3	8	7	4	8	0	2	5
3	6	3	4	1	9	8	1	0	9	0	1	1	0	9	3	6	8	6	0
9	4	6	7	6	7	9	1	2	2	7	2	3	9	3	4	6	9	8	1
5	9	9	8	4	4	5	9	1	5	4	7	3	0	6	8	1	6	8	1
8	1	8	8	2	3	9	1	4	2	4	9	1	4	0	6	0	3	2	8
0	5	3	8	0	4	3	9	4	6	0	8	8	3	8	7	1	2	2	3
9	7	1	4	2	7	5	5	2	8	6	6	3	5	5	9	9	0	6	8
6	9	5	9	4	9	1	8	2	0	2	5	3	9	1	2	0	3	0	8
7	4	9	1	4	8	8	6	6	8	5	9	4	8	5	7	7	9	6	7
3	8	1	2	2	4	0	1	4	5	7	7	4	0	4	8	9	4	7	0
9	9	9	7	8	0	0	9	3	2	7	0	5	0	2	7	8	7	3	6
4	8	1	5	8	5	5	1	4	9	6	4	4	4	7	4	5	7	5	0
8	6	7	3	6	1	7	1	1	3	5	5	7	4	4	7	6	7	2	8
4	7	1	4	0	3	6	2	4	4	4	4	0	3	6	3	4	1	2	8
6	5	5	8	8	4	3	4	8	9	0	6	7	6	0	0	8	6	8	4
9	2	0	9	8	2	8	3	4	3	2	8	9	4	8	7	9	4	9	4
1	3	7	9	4	8	3	7	0	8	6	6	6	8	4	1	1	3	1	3
3	3	2	5	6	7	6	1	6	6	1	7	6	5	8	1	6	2	2	7
9	9	9	8	2	8	8	1	9	1	6	2	7	5	1	8	6	1	4	4
1	7	5	4	0	9	5	7	8	7	5	0	8	6	6	2	5	3	2	3
2	7	1	7	8	8	3	8	6	9	9	2	7	4	5	9	5	6	6	6
6	0	9	2	6	1	5	1	2	3	1	8	1	2	0	8	6	4	4	0
3	3	6	3	4	9	6	4	4	9	8	5	7	3	3	4	2	3	2	8
0	1	9	7	9	7	9	4	4	1	6	6	7	7	0	7	9	8	6	8
4	7	1	5	3	7	0	9	2	5	2	1	0	0	4	0	4	6	8	8
7	8	9	9	6	8	5	6	8	1	9	2	7	5	1	7	0	1	5	5
2	2	3	3	1	8	1	9	8	4	2	8	5	2	8	1	7	6	4	6
2	6	6	4	1	4	8	1	0	6	0	1	3	4	0	9	1	2	8	6
5	1	9	0	3	9	1	6	1	7	8	8	2	8	0	7	8	4	8	0
9	0	5	8	4	9	2	2	3	9	8	5	9	5	7	8	4	9	9	4
8	6	1	9	2	5	0	0	7	9	0	0	7	4	5	4	8	6	2	3
1	9	1	0	9	7	5	1	2	7	1	9	4	8	4	8	9	6	6	9
5	6	0	6	1	3	3	5	2	1	0	1	9	2	8	0	2	6	6	3
8	6	9	9	8	0	8	1	8	2	6	6	8	4	0	7	8	2	5	1
3	1	6	1	0	5	7	5	7	0	6	3	0	4	1	4	0	3	0	8

Tabla N° 2.1

TABLA DE LA DISTRIBUCIÓN NORMAL ESTANDAR

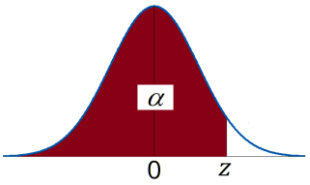


Área bajo la curva normal: $[P(Z \leq z) = \alpha]$

Z	-0.09	-0.08	-0.07	-0.06	-0.05	-0.04	-0.03	-0.02	-0.01	-0.00
-3.9	0.00003	0.00003	0.00004	0.00004	0.00004	0.00004	0.00004	0.00004	0.00005	0.00005
-3.8	0.00005	0.00005	0.00005	0.00006	0.00006	0.00006	0.00006	0.00007	0.00007	0.00007
-3.7	0.00008	0.00008	0.00008	0.00009	0.00009	0.00009	0.00010	0.00010	0.00010	0.00011
-3.6	0.00011	0.00012	0.00012	0.00013	0.00013	0.00014	0.00014	0.00015	0.00015	0.00016
-3.5	0.00017	0.00017	0.00018	0.00019	0.00019	0.00020	0.00021	0.00022	0.00022	0.00023
-3.4	0.00024	0.00025	0.00026	0.00027	0.00028	0.00029	0.00030	0.00031	0.00033	0.00034
-3.3	0.00035	0.00036	0.00038	0.00039	0.00040	0.00042	0.00043	0.00045	0.00047	0.00048
-3.2	0.00050	0.00052	0.00054	0.00056	0.00058	0.00060	0.00062	0.00064	0.00066	0.00069
-3.1	0.00071	0.00074	0.00076	0.00079	0.00082	0.00085	0.00087	0.00090	0.00094	0.00097
-3.0	0.00100	0.00104	0.00107	0.00111	0.00114	0.00118	0.00122	0.00126	0.00131	0.00135
-2.9	0.00139	0.00144	0.00149	0.00154	0.00159	0.00164	0.00169	0.00175	0.00181	0.00187
-2.8	0.00193	0.00199	0.00205	0.00212	0.00219	0.00226	0.00233	0.00240	0.00248	0.00256
-2.7	0.00264	0.00272	0.00280	0.00289	0.00298	0.00307	0.00317	0.00326	0.00336	0.00347
-2.6	0.00357	0.00368	0.00379	0.00391	0.00402	0.00415	0.00427	0.00440	0.00453	0.00466
-2.5	0.00480	0.00494	0.00508	0.00523	0.00539	0.00554	0.00570	0.00587	0.00604	0.00621
-2.4	0.00639	0.00657	0.00676	0.00695	0.00714	0.00734	0.00755	0.00776	0.00798	0.00820
-2.3	0.00842	0.00866	0.00889	0.00914	0.00939	0.00964	0.00990	0.01017	0.01044	0.01072
-2.2	0.01101	0.01130	0.01160	0.01191	0.01222	0.01255	0.01287	0.01321	0.01355	0.01390
-2.1	0.01426	0.01463	0.01500	0.01539	0.01578	0.01618	0.01659	0.01700	0.01743	0.01786
-2.0	0.01831	0.01876	0.01923	0.01970	0.02018	0.02068	0.02118	0.02169	0.02222	0.02275
-1.9	0.02330	0.02385	0.02442	0.02500	0.02559	0.02619	0.02680	0.02743	0.02807	0.02872
-1.8	0.02938	0.03005	0.03074	0.03144	0.03216	0.03288	0.03362	0.03438	0.03515	0.03593
-1.7	0.03673	0.03754	0.03836	0.03920	0.04006	0.04093	0.04182	0.04272	0.04363	0.04457
-1.6	0.04551	0.04648	0.04746	0.04846	0.04947	0.05050	0.05155	0.05262	0.05370	0.05480
-1.5	0.05592	0.05705	0.05821	0.05938	0.06057	0.06178	0.06301	0.06426	0.06552	0.06681
-1.4	0.06811	0.06944	0.07078	0.07215	0.07353	0.07493	0.07636	0.07780	0.07927	0.08076
-1.3	0.08226	0.08379	0.08534	0.08691	0.08851	0.09012	0.09176	0.09342	0.09510	0.09680
-1.2	0.09853	0.10027	0.10204	0.10383	0.10565	0.10749	0.10935	0.11123	0.11314	0.11507
-1.1	0.11702	0.11900	0.12100	0.12302	0.12507	0.12714	0.12924	0.13136	0.13350	0.13567
-1.0	0.13786	0.14007	0.14231	0.14457	0.14686	0.14917	0.15151	0.15386	0.15625	0.15866
-0.9	0.16109	0.16354	0.16602	0.16853	0.17106	0.17361	0.17619	0.17879	0.18141	0.18406
-0.8	0.18673	0.18943	0.19215	0.19489	0.19766	0.20045	0.20327	0.20611	0.20897	0.21186
-0.7	0.21476	0.21770	0.22065	0.22363	0.22663	0.22965	0.23270	0.23576	0.23885	0.24196
-0.6	0.24510	0.24825	0.25143	0.25463	0.25785	0.26109	0.26435	0.26763	0.27093	0.27425
-0.5	0.27760	0.28096	0.28434	0.28774	0.29116	0.29460	0.29806	0.30153	0.30503	0.30854
-0.4	0.31207	0.31561	0.31918	0.32276	0.32636	0.32997	0.33360	0.33724	0.34090	0.34458
-0.3	0.34827	0.35197	0.35569	0.35942	0.36317	0.36693	0.37070	0.37448	0.37828	0.38209
-0.2	0.38591	0.38974	0.39358	0.39743	0.40129	0.40517	0.40905	0.41294	0.41683	0.42074
-0.1	0.42465	0.42858	0.43251	0.43644	0.44038	0.44433	0.44828	0.45224	0.45620	0.46017
-0.0	0.46414	0.46812	0.47210	0.47608	0.48006	0.48405	0.48803	0.49202	0.49601	0.50000

Tabla N° 2.2

TABLA DE LA DISTRIBUCIÓN NORMAL

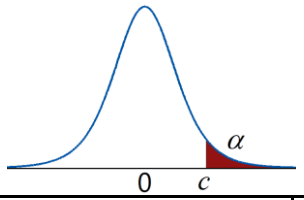


Área bajo la curva normal: $[P(Z \leq z) = \alpha]$

Z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.50000	0.50399	0.50798	0.51197	0.51595	0.51994	0.52392	0.52790	0.53188	0.53586
0.1	0.53983	0.54380	0.54776	0.55172	0.55567	0.55962	0.56356	0.56749	0.57142	0.57535
0.2	0.57926	0.58317	0.58706	0.59095	0.59483	0.59871	0.60257	0.60642	0.61026	0.61409
0.3	0.61791	0.62172	0.62552	0.62930	0.63307	0.63683	0.64058	0.64431	0.64803	0.65173
0.4	0.65542	0.65910	0.66276	0.66640	0.67003	0.67364	0.67724	0.68082	0.68439	0.68793
0.5	0.69146	0.69497	0.69847	0.70194	0.70540	0.70884	0.71226	0.71566	0.71904	0.72240
0.6	0.72575	0.72907	0.73237	0.73565	0.73891	0.74215	0.74537	0.74857	0.75175	0.75490
0.7	0.75804	0.76115	0.76424	0.76730	0.77035	0.77337	0.77637	0.77935	0.78230	0.78524
0.8	0.78814	0.79103	0.79389	0.79673	0.79955	0.80234	0.80511	0.80785	0.81057	0.81327
0.9	0.81594	0.81859	0.82121	0.82381	0.82639	0.82894	0.83147	0.83398	0.83646	0.83891
1.0	0.84134	0.84375	0.84614	0.84849	0.85083	0.85314	0.85543	0.85769	0.85993	0.86214
1.1	0.86433	0.86650	0.86864	0.87076	0.87286	0.87493	0.87698	0.87900	0.88100	0.88298
1.2	0.88493	0.88686	0.88877	0.89065	0.89251	0.89435	0.89617	0.89796	0.89973	0.90147
1.3	0.90320	0.90490	0.90658	0.90824	0.90988	0.91149	0.91309	0.91466	0.91621	0.91774
1.4	0.91924	0.92073	0.92220	0.92364	0.92507	0.92647	0.92785	0.92922	0.93056	0.93189
1.5	0.93319	0.93448	0.93574	0.93699	0.93822	0.93943	0.94062	0.94179	0.94295	0.94408
1.6	0.94520	0.94630	0.94738	0.94845	0.94950	0.95053	0.95154	0.95254	0.95352	0.95449
1.7	0.95543	0.95637	0.95728	0.95818	0.95907	0.95994	0.96080	0.96164	0.96246	0.96327
1.8	0.96407	0.96485	0.96562	0.96638	0.96712	0.96784	0.96856	0.96926	0.96995	0.97062
1.9	0.97128	0.97193	0.97257	0.97320	0.97381	0.97441	0.97500	0.97558	0.97615	0.97670
2.0	0.97725	0.97778	0.97831	0.97882	0.97932	0.97982	0.98030	0.98077	0.98124	0.98169
2.1	0.98214	0.98257	0.98300	0.98341	0.98382	0.98422	0.98461	0.98500	0.98537	0.98574
2.2	0.98610	0.98645	0.98679	0.98713	0.98745	0.98778	0.98809	0.98840	0.98870	0.98899
2.3	0.98928	0.98956	0.98983	0.99010	0.99036	0.99061	0.99086	0.99111	0.99134	0.99158
2.4	0.99180	0.99202	0.99224	0.99245	0.99266	0.99286	0.99305	0.99324	0.99343	0.99361
2.5	0.99379	0.99396	0.99413	0.99430	0.99446	0.99461	0.99477	0.99492	0.99506	0.99520
2.6	0.99534	0.99547	0.99560	0.99573	0.99585	0.99598	0.99609	0.99621	0.99632	0.99643
2.7	0.99653	0.99664	0.99674	0.99683	0.99693	0.99702	0.99711	0.99720	0.99728	0.99736
2.8	0.99744	0.99752	0.99760	0.99767	0.99774	0.99781	0.99788	0.99795	0.99801	0.99807
2.9	0.99813	0.99819	0.99825	0.99831	0.99836	0.99841	0.99846	0.99851	0.99856	0.99861
3.0	0.99865	0.99869	0.99874	0.99878	0.99882	0.99886	0.99889	0.99893	0.99897	0.99900
3.1	0.99903	0.99907	0.99910	0.99913	0.99916	0.99918	0.99921	0.99924	0.99926	0.99929
3.2	0.99931	0.99934	0.99936	0.99938	0.99940	0.99942	0.99944	0.99946	0.99948	0.99950
3.3	0.99952	0.99953	0.99955	0.99957	0.99958	0.99960	0.99961	0.99962	0.99964	0.99965
3.4	0.99966	0.99968	0.99969	0.99970	0.99971	0.99972	0.99973	0.99974	0.99975	0.99976
3.5	0.99977	0.99978	0.99978	0.99979	0.99980	0.99981	0.99982	0.99982	0.99983	0.99984
3.6	0.99984	0.99985	0.99985	0.99986	0.99986	0.99987	0.99987	0.99988	0.99988	0.99989
3.7	0.99989	0.99990	0.99990	0.99990	0.99991	0.99991	0.99992	0.99992	0.99992	0.99993
3.8	0.99993	0.99993	0.99993	0.99994	0.99994	0.99994	0.99994	0.99995	0.99995	0.99995
3.9	0.99995	0.99995	0.99996	0.99996	0.99996	0.99996	0.99996	0.99996	0.99997	0.99997

Tabla Nº 3.1

TABLA DE LA DISTRIBUCIÓN T-STUDENT

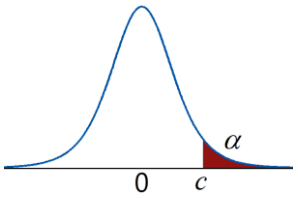


Área bajo la curva: $[P(T \geq c) = \alpha]$

	α													
υ	**0.400**	**0.300**	**0.200**	**0.150**	**0.100**	**0.050**	**0.040**	**0.030**	**0.025**	**0.020**	**0.015**	**0.010**	**0.005**	
1	0.3249	0.7265	1.3764	1.9626	3.0777	6.3138	7.9158	10.5789	12.7062	15.8945	21.2050	31.8205	63.6567	**1**
2	0.2887	0.6172	1.0607	1.3862	1.8856	2.9200	3.3198	3.8964	4.3027	4.8487	5.6428	6.9646	9.9248	**2**
3	0.2767	0.5844	0.9785	1.2498	1.6377	2.3534	2.6054	2.9505	3.1825	3.4819	3.8961	4.5407	5.8409	**3**
4	0.2707	0.5687	0.9410	1.1896	1.5332	2.1319	2.3329	2.6008	2.7765	2.9985	3.2976	3.7470	4.6041	**4**
5	0.2672	0.5594	0.9195	1.1558	1.4759	2.0151	2.1910	2.4216	2.5706	2.7565	3.0029	3.3649	4.0321	**5**
6	0.2648	0.5534	0.9057	1.1342	1.4398	1.9432	2.1043	2.3133	2.4469	2.6122	2.8289	3.1427	3.7074	**6**
7	0.2632	0.5491	0.8960	1.1192	1.4149	1.8946	2.0460	2.2409	2.3646	2.5168	2.7146	2.9980	3.4995	**7**
8	0.2619	0.5459	0.8889	1.1082	1.3968	1.8596	2.0042	2.1892	2.3060	2.4490	2.6338	2.8965	3.3554	**8**
9	0.2610	0.5435	0.8834	1.0997	1.3830	1.8331	1.9727	2.1504	2.2622	2.3984	2.5738	2.8214	3.2498	**9**
10	0.2602	0.5415	0.8791	1.0931	1.3722	1.8125	1.9481	2.1202	2.2281	2.3593	2.5275	2.7638	3.1693	**10**
11	0.2596	0.5399	0.8755	1.0877	1.3634	1.7959	1.9284	2.0961	2.2010	2.3281	2.4907	2.7181	3.1058	**11**
12	0.2590	0.5386	0.8726	1.0832	1.3562	1.7823	1.9123	2.0764	2.1788	2.3027	2.4607	2.6810	3.0545	**12**
13	0.2586	0.5375	0.8702	1.0795	1.3502	1.7709	1.8989	2.0600	2.1604	2.2816	2.4359	2.6503	3.0123	**13**
14	0.2582	0.5366	0.8681	1.0763	1.3450	1.7613	1.8875	2.0462	2.1448	2.2638	2.4149	2.6245	2.9768	**14**
15	0.2579	0.5357	0.8662	1.0735	1.3406	1.7531	1.8777	2.0343	2.1315	2.2485	2.3970	2.6025	2.9467	**15**
16	0.2576	0.5350	0.8647	1.0711	1.3368	1.7459	1.8693	2.0240	2.1199	2.2354	2.3816	2.5835	2.9208	**16**
17	0.2574	0.5344	0.8633	1.0690	1.3334	1.7396	1.8619	2.0150	2.1098	2.2239	2.3681	2.5669	2.8982	**17**
18	0.2571	0.5338	0.8621	1.0672	1.3304	1.7341	1.8553	2.0071	2.1009	2.2137	2.3562	2.5524	2.8784	**18**
19	0.2569	0.5333	0.8610	1.0655	1.3277	1.7291	1.8495	2.0000	2.0930	2.2047	2.3457	2.5395	2.8609	**19**
20	0.2567	0.5329	0.8600	1.0640	1.3253	1.7247	1.8443	1.9937	2.0860	2.1967	2.3362	2.5280	2.8453	**20**
21	0.2566	0.5325	0.8591	1.0627	1.3232	1.7207	1.8397	1.9880	2.0796	2.1894	2.3278	2.5177	2.8314	**21**
22	0.2564	0.5321	0.8583	1.0615	1.3212	1.7171	1.8354	1.9829	2.0739	2.1829	2.3202	2.5083	2.8188	**22**
23	0.2563	0.5318	0.8575	1.0603	1.3195	1.7139	1.8316	1.9783	2.0687	2.1770	2.3132	2.4999	2.8073	**23**
24	0.2562	0.5314	0.8569	1.0593	1.3178	1.7109	1.8281	1.9740	2.0639	2.1715	2.3069	2.4922	2.7969	**24**
25	0.2561	0.5312	0.8562	1.0584	1.3164	1.7081	1.8248	1.9701	2.0595	2.1666	2.3011	2.4851	2.7874	**25**
26	0.2560	0.5309	0.8557	1.0575	1.3150	1.7056	1.8219	1.9665	2.0555	2.1620	2.2958	2.4786	2.7787	**26**
27	0.2559	0.5307	0.8551	1.0567	1.3137	1.7033	1.8191	1.9632	2.0518	2.1578	2.2909	2.4727	2.7707	**27**
28	0.2558	0.5304	0.8547	1.0560	1.3125	1.7011	1.8166	1.9601	2.0484	2.1539	2.2864	2.4671	2.7633	**28**
29	0.2557	0.5302	0.8542	1.0553	1.3114	1.6991	1.8142	1.9573	2.0452	2.1503	2.2822	2.4620	2.7564	**29**
30	0.2556	0.5300	0.8538	1.0547	1.3104	1.6973	1.8121	1.9547	2.0423	2.1470	2.2783	2.4573	2.7500	**30**
31	0.2555	0.5298	0.8534	1.0541	1.3095	1.6955	1.8100	1.9522	2.0395	2.1438	2.2746	2.4528	2.7440	**31**
32	0.2555	0.5297	0.8530	1.0535	1.3086	1.6939	1.8081	1.9499	2.0369	2.1409	2.2712	2.4487	2.7385	**32**
33	0.2554	0.5295	0.8527	1.0530	1.3077	1.6924	1.8063	1.9477	2.0345	2.1382	2.2680	2.4448	2.7333	**33**
34	0.2553	0.5294	0.8523	1.0525	1.3070	1.6909	1.8046	1.9457	2.0322	2.1356	2.2650	2.4412	2.7284	**34**
35	0.2553	0.5292	0.8520	1.0520	1.3062	1.6896	1.8030	1.9438	2.0301	2.1332	2.2622	2.4377	2.7238	**35**
36	0.2552	0.5291	0.8517	1.0516	1.3055	1.6883	1.8015	1.9420	2.0281	2.1309	2.2595	2.4345	2.7195	**36**
37	0.2552	0.5290	0.8514	1.0512	1.3049	1.6871	1.8001	1.9402	2.0262	2.1287	2.2570	2.4315	2.7154	**37**
38	0.2551	0.5288	0.8512	1.0508	1.3042	1.6860	1.7988	1.9386	2.0244	2.1267	2.2547	2.4286	2.7116	**38**
39	0.2551	0.5287	0.8509	1.0504	1.3036	1.6849	1.7975	1.9371	2.0227	2.1247	2.2524	2.4258	2.7079	**39**
40	0.2550	0.5286	0.8507	1.0501	1.3031	1.6839	1.7963	1.9357	2.0211	2.1229	2.2503	2.4233	2.7045	**40**

Tabla Nº 3.2

TABLA DE LA DISTRIBUCIÓN T-STUDENT



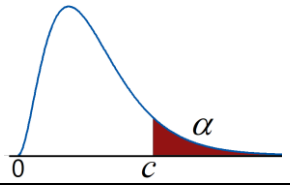
Área bajo la curva: $[P(T \geq c) = \alpha]$

	α													
υ	0.400	0.300	0.200	0.150	0.100	0.050	0.040	0.030	0.025	0.020	0.015	0.010	0.005	υ
41	0.2550	0.5285	0.8505	1.0497	1.3025	1.6829	1.7952	1.9343	2.0195	2.1212	2.2483	2.4208	2.7012	41
42	0.2550	0.5284	0.8503	1.0494	1.3020	1.6820	1.7941	1.9330	2.0181	2.1195	2.2463	2.4185	2.6981	42
43	0.2549	0.5283	0.8501	1.0491	1.3016	1.6811	1.7931	1.9317	2.0167	2.1179	2.2445	2.4163	2.6951	43
44	0.2549	0.5282	0.8499	1.0488	1.3011	1.6802	1.7921	1.9305	2.0154	2.1164	2.2428	2.4141	2.6923	44
45	0.2549	0.5281	0.8497	1.0485	1.3007	1.6794	1.7911	1.9294	2.0141	2.1150	2.2411	2.4121	2.6896	45
46	0.2548	0.5281	0.8495	1.0483	1.3002	1.6787	1.7902	1.9283	2.0129	2.1136	2.2395	2.4102	2.6870	46
47	0.2548	0.5280	0.8493	1.0480	1.2998	1.6779	1.7894	1.9273	2.0117	2.1123	2.2380	2.4084	2.6846	47
48	0.2548	0.5279	0.8492	1.0478	1.2994	1.6772	1.7886	1.9263	2.0106	2.1111	2.2365	2.4066	2.6822	48
49	0.2547	0.5278	0.8490	1.0475	1.2991	1.6766	1.7878	1.9254	2.0096	2.1099	2.2351	2.4049	2.6800	49
50	0.2547	0.5278	0.8489	1.0473	1.2987	1.6759	1.7870	1.9244	2.0086	2.1087	2.2338	2.4033	2.6778	50
51	0.2547	0.5277	0.8487	1.0471	1.2984	1.6753	1.7863	1.9236	2.0076	2.1076	2.2325	2.4017	2.6757	51
52	0.2547	0.5276	0.8486	1.0469	1.2981	1.6747	1.7856	1.9227	2.0067	2.1066	2.2313	2.4002	2.6737	52
53	0.2546	0.5276	0.8485	1.0467	1.2977	1.6741	1.7849	1.9219	2.0058	2.1055	2.2301	2.3988	2.6718	53
54	0.2546	0.5275	0.8483	1.0465	1.2974	1.6736	1.7843	1.9211	2.0049	2.1046	2.2290	2.3974	2.6700	54
55	0.2546	0.5275	0.8482	1.0463	1.2971	1.6730	1.7836	1.9204	2.0040	2.1036	2.2279	2.3961	2.6682	55
56	0.2546	0.5274	0.8481	1.0461	1.2969	1.6725	1.7830	1.9197	2.0032	2.1027	2.2268	2.3948	2.6665	56
57	0.2545	0.5274	0.8480	1.0460	1.2966	1.6720	1.7825	1.9190	2.0025	2.1018	2.2258	2.3936	2.6649	57
58	0.2545	0.5273	0.8479	1.0458	1.2963	1.6716	1.7819	1.9183	2.0017	2.1010	2.2248	2.3924	2.6633	58
59	0.2545	0.5273	0.8478	1.0456	1.2961	1.6711	1.7814	1.9177	2.0010	2.1002	2.2238	2.3912	2.6618	59
60	0.2545	0.5272	0.8477	1.0455	1.2958	1.6707	1.7809	1.9170	2.0003	2.0994	2.2229	2.3901	2.6603	60
61	0.2545	0.5272	0.8476	1.0453	1.2956	1.6702	1.7803	1.9164	1.9996	2.0986	2.2220	2.3891	2.6589	61
62	0.2544	0.5271	0.8475	1.0452	1.2954	1.6698	1.7799	1.9158	1.9990	2.0979	2.2212	2.3880	2.6575	62
63	0.2544	0.5271	0.8474	1.0450	1.2951	1.6694	1.7794	1.9153	1.9983	2.0972	2.2204	2.3870	2.6562	63
64	0.2544	0.5270	0.8473	1.0449	1.2949	1.6690	1.7789	1.9147	1.9977	2.0965	2.2196	2.3860	2.6549	64
65	0.2544	0.5270	0.8472	1.0448	1.2947	1.6686	1.7785	1.9142	1.9971	2.0958	2.2188	2.3851	2.6536	65
66	0.2544	0.5269	0.8471	1.0446	1.2945	1.6683	1.7781	1.9137	1.9966	2.0951	2.2180	2.3842	2.6524	66
67	0.2544	0.5269	0.8470	1.0445	1.2943	1.6679	1.7777	1.9132	1.9960	2.0945	2.2173	2.3833	2.6512	67
68	0.2543	0.5269	0.8469	1.0444	1.2941	1.6676	1.7772	1.9127	1.9955	2.0939	2.2166	2.3825	2.6501	68
69	0.2543	0.5268	0.8469	1.0443	1.2939	1.6672	1.7769	1.9122	1.9950	2.0933	2.2159	2.3816	2.6490	69
70	0.2543	0.5268	0.8468	1.0442	1.2938	1.6669	1.7765	1.9118	1.9944	2.0927	2.2152	2.3808	2.6479	70
75	0.2543	0.5266	0.8464	1.0437	1.2929	1.6654	1.7747	1.9097	1.9921	2.0901	2.2122	2.3771	2.6430	75
80	0.2542	0.5265	0.8461	1.0432	1.2922	1.6641	1.7732	1.9078	1.9901	2.0878	2.2095	2.3739	2.6387	80
85	0.2541	0.5264	0.8459	1.0428	1.2916	1.6630	1.7719	1.9062	1.9883	2.0857	2.2071	2.3710	2.6349	85
90	0.2541	0.5263	0.8456	1.0424	1.2910	1.6620	1.7707	1.9048	1.9867	2.0839	2.2050	2.3685	2.6316	90
95	0.2541	0.5262	0.8454	1.0421	1.2905	1.6611	1.7696	1.9035	1.9853	2.0823	2.2032	2.3662	2.6286	95
100	0.2540	0.5261	0.8452	1.0418	1.2901	1.6602	1.7687	1.9024	1.9840	2.0809	2.2015	2.3642	2.6259	100
105	0.2540	0.5260	0.8451	1.0416	1.2897	1.6595	1.7678	1.9013	1.9828	2.0796	2.2000	2.3624	2.6235	105
110	0.2540	0.5259	0.8449	1.0413	1.2893	1.6588	1.7670	1.9004	1.9818	2.0784	2.1986	2.3607	2.6213	110
120	0.2539	0.5258	0.8446	1.0409	1.2887	1.6577	1.7656	1.8987	1.9799	2.0763	2.1962	2.3578	2.6174	120
∞	0.2534	0.5244	0.8416	1.0364	1.2816	1.6448	1.7507	1.8808	1.9600	2.0538	2.1701	2.3264	2.5758	∞

Tabla N°4.1

TABLA DE LA DISTRIBUCIÓN JI-CUADRADO

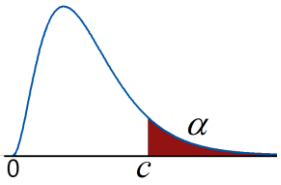
Áreas de la cola derecha (α)



ν	α										
	0.995	**0.990**	**0.980**	**0.975**	**0.960**	**0.950**	**0.900**	**0.800**	**0.700**	**0.600**	**0.500**
1	0.000	0.000	0.001	0.001	0.003	0.004	0.016	0.064	0.148	0.275	0.455
2	0.010	0.020	0.040	0.051	0.082	0.103	0.211	0.446	0.713	1.022	1.386
3	0.072	0.115	0.185	0.216	0.300	0.352	0.584	1.005	1.424	1.869	2.366
4	0.207	0.297	0.429	0.484	0.627	0.711	1.064	1.649	2.195	2.753	3.357
5	0.412	0.554	0.752	0.831	1.031	1.145	1.610	2.343	3.000	3.656	4.351
6	0.676	0.872	1.134	1.237	1.492	1.635	2.204	3.070	3.828	4.570	5.348
7	0.989	1.239	1.564	1.690	1.997	2.167	2.833	3.822	4.671	5.493	6.346
8	1.344	1.647	2.032	2.180	2.537	2.733	3.490	4.594	5.527	6.423	7.344
9	1.735	2.088	2.532	2.700	3.105	3.325	4.168	5.380	6.393	7.357	8.343
10	2.156	2.558	3.059	3.247	3.697	3.940	4.865	6.179	7.267	8.295	9.342
11	2.603	3.053	3.609	3.816	4.309	4.575	5.578	6.989	8.148	9.237	10.341
12	3.074	3.571	4.178	4.404	4.939	5.226	6.304	7.807	9.034	10.182	11.340
13	3.565	4.107	4.765	5.009	5.584	5.892	7.041	8.634	9.926	11.129	12.340
14	4.075	4.660	5.368	5.629	6.243	6.571	7.790	9.467	10.821	12.078	13.339
15	4.601	5.229	5.985	6.262	6.914	7.261	8.547	10.307	11.721	13.030	14.339
16	5.142	5.812	6.614	6.908	7.596	7.962	9.312	11.152	12.624	13.983	15.338
17	5.697	6.408	7.255	7.564	8.288	8.672	10.085	12.002	13.531	14.937	16.338
18	6.265	7.015	7.906	8.231	8.989	9.390	10.865	12.857	14.440	15.893	17.338
19	6.844	7.633	8.567	8.907	9.698	10.117	11.651	13.716	15.352	16.850	18.338
20	7.434	8.260	9.237	9.591	10.415	10.851	12.443	14.578	16.266	17.809	19.337
21	8.034	8.897	9.915	10.283	11.140	11.591	13.240	15.445	17.182	18.768	20.337
22	8.643	9.542	10.600	10.982	11.870	12.338	14.041	16.314	18.101	19.729	21.337
23	9.260	10.196	11.293	11.689	12.607	13.091	14.848	17.187	19.021	20.690	22.337
24	9.886	10.856	11.992	12.401	13.350	13.848	15.659	18.062	19.943	21.652	23.337
25	10.520	11.524	12.697	13.120	14.098	14.611	16.473	18.940	20.867	22.616	24.337
26	11.160	12.198	13.409	13.844	14.851	15.379	17.292	19.820	21.792	23.579	25.336
27	11.808	12.878	14.125	14.573	15.609	16.151	18.114	20.703	22.719	24.544	26.336
28	12.461	13.565	14.847	15.308	16.371	16.928	18.939	21.588	23.647	25.509	27.336
29	13.121	14.256	15.574	16.047	17.138	17.708	19.768	22.475	24.577	26.475	28.336
30	13.787	14.953	16.306	16.791	17.908	18.493	20.599	23.364	25.508	27.442	29.336
31	14.458	15.655	17.042	17.539	18.683	19.281	21.434	24.255	26.440	28.409	30.336
32	15.134	16.362	17.783	18.291	19.461	20.072	22.271	25.148	27.373	29.376	31.336
33	15.815	17.074	18.527	19.047	20.242	20.867	23.110	26.042	28.307	30.344	32.336
34	16.501	17.789	19.275	19.806	21.027	21.664	23.952	26.938	29.242	31.313	33.336
35	17.192	18.509	20.027	20.569	21.815	22.465	24.797	27.836	30.178	32.282	34.336
40	20.707	22.164	23.838	24.433	25.799	26.509	29.051	32.345	34.872	37.134	39.335
50	27.991	29.707	31.664	32.357	33.943	34.764	37.689	41.449	44.313	46.864	49.335
60	35.534	37.485	39.699	40.482	42.266	43.188	46.459	50.641	53.809	56.620	59.335
70	43.275	45.442	47.893	48.758	50.724	51.739	55.329	59.898	63.346	66.396	69.334
120	83.852	86.923	90.367	91.573	94.303	95.705	100.624	106.806	111.419	115.465	119.334

Tabla N°4.2

TABLA DE LA DISTRIBUCIÓN JI-CUADRADO

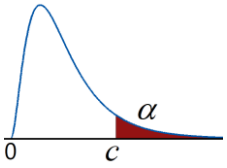


Áreas de la cola derecha **(α)**

ν	α									
	0.250	**0.200**	**0.150**	**0.125**	**0.100**	**0.050**	**0.025**	**0.020**	**0.010**	**0.005**
1	1.323	1.642	2.072	2.354	2.706	3.841	5.024	5.412	6.635	7.879
2	2.773	3.219	3.794	4.159	4.605	5.991	7.378	7.824	9.210	10.597
3	4.108	4.642	5.317	5.739	6.251	7.815	9.348	9.837	11.345	12.838
4	5.385	5.989	6.745	7.214	7.779	9.488	11.143	11.668	13.277	14.860
5	6.626	7.289	8.115	8.625	9.236	11.070	12.832	13.388	15.086	16.750
6	7.841	8.558	9.446	9.992	10.645	12.592	14.449	15.033	16.812	18.548
7	9.037	9.803	10.748	11.326	12.017	14.067	16.013	16.622	18.475	20.278
8	10.219	11.030	12.027	12.636	13.362	15.507	17.535	18.168	20.090	21.955
9	11.389	12.242	13.288	13.926	14.684	16.919	19.023	19.679	21.666	23.589
10	12.549	13.442	14.534	15.198	15.987	18.307	20.483	21.161	23.209	25.188
11	13.701	14.631	15.767	16.457	17.275	19.675	21.920	22.618	24.725	26.757
12	14.845	15.812	16.989	17.703	18.549	21.026	23.337	24.054	26.217	28.300
13	15.984	16.985	18.202	18.939	19.812	22.362	24.736	25.471	27.688	29.819
14	17.117	18.151	19.406	20.166	21.064	23.685	26.119	26.873	29.141	31.319
15	18.245	19.311	20.603	21.384	22.307	24.996	27.488	28.259	30.578	32.801
16	19.369	20.465	21.793	22.595	23.542	26.296	28.845	29.633	32.000	34.267
17	20.489	21.615	22.977	23.799	24.769	27.587	30.191	30.995	33.409	35.718
18	21.605	22.760	24.155	24.997	25.989	28.869	31.526	32.346	34.805	37.156
19	22.718	23.900	25.329	26.189	27.204	30.144	32.852	33.687	36.191	38.582
20	23.828	25.038	26.498	27.376	28.412	31.410	34.170	35.020	37.566	39.997
21	24.935	26.171	27.662	28.559	29.615	32.671	35.479	36.343	38.932	41.401
22	26.039	27.301	28.822	29.737	30.813	33.924	36.781	37.659	40.289	42.796
23	27.141	28.429	29.979	30.911	32.007	35.172	38.076	38.968	41.638	44.181
24	28.241	29.553	31.132	32.081	33.196	36.415	39.364	40.270	42.980	45.558
25	29.339	30.675	32.282	33.247	34.382	37.652	40.646	41.566	44.314	46.928
26	30.435	31.795	33.429	34.410	35.563	38.885	41.923	42.856	45.642	48.290
27	31.528	32.912	34.574	35.570	36.741	40.113	43.195	44.140	46.963	49.645
28	32.620	34.027	35.715	36.727	37.916	41.337	44.461	45.419	48.278	50.994
29	33.711	35.139	36.854	37.881	39.087	42.557	45.722	46.693	49.588	52.336
30	34.800	36.250	37.990	39.033	40.256	43.773	46.979	47.962	50.892	53.672
31	35.887	37.359	39.124	40.181	41.422	44.985	48.232	49.226	52.191	55.003
32	36.973	38.466	40.256	41.328	42.585	46.194	49.480	50.487	53.486	56.328
33	38.058	39.572	41.386	42.472	43.745	47.400	50.725	51.743	54.776	57.648
34	39.141	40.676	42.514	43.614	44.903	48.602	51.966	52.995	56.061	58.964
35	40.223	41.778	43.640	44.753	46.059	49.802	53.203	54.244	57.342	60.275
40	45.616	47.269	49.244	50.424	51.805	55.758	59.342	60.436	63.691	66.766
50	56.334	58.164	60.346	61.647	63.167	67.505	71.420	72.613	76.154	79.490
60	66.981	68.972	71.341	72.751	74.397	79.082	83.298	84.580	88.379	91.952
70	77.577	79.715	82.255	83.765	85.527	90.531	95.023	96.387	100.425	104.215
120	130.055	132.806	136.062	137.990	140.233	146.567	152.211	153.918	158.950	163.648

Tabla N°5.1

TABLA DE LA DISTRIBUCIÓN F



Área de la cola derecha **(α)**

v_1: grados de libertad del numerador y v_2 grados de libertad del denominador

α	v_2	v_1 = 1	2	3	4	5	6	7	8	9	10	11
0.050	**1**	161.45	199.50	215.71	224.58	230.16	233.99	236.77	238.88	240.54	241.88	242.98
0.025		647.79	799.50	864.16	899.58	921.85	937.11	948.22	956.66	963.28	968.63	973.03
0.010		4052.18	4999.50	5403.35	5624.58	5763.65	5858.99	5928.36	5981.07	6022.47	6055.85	6083.32
0.005		16210.72	19999.50	21614.74	22499.58	23055.80	23437.11	23714.57	23925.41	24091.00	24224.49	24334.36
0.050	**2**	18.51	19.00	19.16	19.25	19.30	19.33	19.35	19.37	19.38	19.40	19.40
0.025		38.51	39.00	39.17	39.25	39.30	39.33	39.36	39.37	39.39	39.40	39.41
0.010		98.50	99.00	99.17	99.25	99.30	99.33	99.36	99.37	99.39	99.40	99.41
0.005		198.50	199.00	199.17	199.25	199.30	199.33	199.36	199.37	199.39	199.40	199.41
0.050	**3**	10.13	9.55	9.28	9.12	9.01	8.94	8.89	8.85	8.81	8.79	8.76
0.025		17.44	16.04	15.44	15.10	14.88	14.73	14.62	14.54	14.47	14.42	14.37
0.010		34.12	30.82	29.46	28.71	28.24	27.91	27.67	27.49	27.35	27.23	27.13
0.005		55.55	49.80	47.47	46.19	45.39	44.84	44.43	44.13	43.88	43.69	43.52
0.050	**4**	7.71	6.94	6.59	6.39	6.26	6.16	6.09	6.04	6.00	5.96	5.94
0.025		12.22	10.65	9.98	9.60	9.36	9.20	9.07	8.98	8.90	8.84	8.79
0.010		21.20	18.00	16.69	15.98	15.52	15.21	14.98	14.80	14.66	14.55	14.45
0.005		31.33	26.28	24.26	23.15	22.46	21.97	21.62	21.35	21.14	20.97	20.82
0.050	**5**	6.61	5.79	5.41	5.19	5.05	4.95	4.88	4.82	4.77	4.74	4.70
0.025		10.01	8.43	7.76	7.39	7.15	6.98	6.85	6.76	6.68	6.62	6.57
0.010		16.26	13.27	12.06	11.39	10.97	10.67	10.46	10.29	10.16	10.05	9.96
0.005		22.78	18.31	16.53	15.56	14.94	14.51	14.20	13.96	13.77	13.62	13.49
0.050	**6**	5.99	5.14	4.76	4.53	4.39	4.28	4.21	4.15	4.10	4.06	4.03
0.025		8.81	7.26	6.60	6.23	5.99	5.82	5.70	5.60	5.52	5.46	5.41
0.010		13.75	10.92	9.78	9.15	8.75	8.47	8.26	8.10	7.98	7.87	7.79
0.005		18.63	14.54	12.92	12.03	11.46	11.07	10.79	10.57	10.39	10.25	10.13
0.050	**7**	5.59	4.74	4.35	4.12	3.97	3.87	3.79	3.73	3.68	3.64	3.60
0.025		8.07	6.54	5.89	5.52	5.29	5.12	4.99	4.90	4.82	4.76	4.71
0.010		12.25	9.55	8.45	7.85	7.46	7.19	6.99	6.84	6.72	6.62	6.54
0.005		16.24	12.40	10.88	10.05	9.52	9.16	8.89	8.68	8.51	8.38	8.27
0.050	**8**	5.32	4.46	4.07	3.84	3.69	3.58	3.50	3.44	3.39	3.35	3.31
0.025		7.57	6.06	5.42	5.05	4.82	4.65	4.53	4.43	4.36	4.30	4.24
0.010		11.26	8.65	7.59	7.01	6.63	6.37	6.18	6.03	5.91	5.81	5.73
0.005		14.69	11.04	9.60	8.81	8.30	7.95	7.69	7.50	7.34	7.21	7.10
0.050	**9**	5.12	4.26	3.86	3.63	3.48	3.37	3.29	3.23	3.18	3.14	3.10
0.025		7.21	5.71	5.08	4.72	4.48	4.32	4.20	4.10	4.03	3.96	3.91
0.010		10.56	8.02	6.99	6.42	6.06	5.80	5.61	5.47	5.35	5.26	5.18
0.005		13.61	10.11	8.72	7.96	7.47	7.13	6.88	6.69	6.54	6.42	6.31
0.050	**10**	4.96	4.10	3.71	3.48	3.33	3.22	3.14	3.07	3.02	2.98	2.94
0.025		6.94	5.46	4.83	4.47	4.24	4.07	3.95	3.85	3.78	3.72	3.66
0.010		10.04	7.56	6.55	5.99	5.64	5.39	5.20	5.06	4.94	4.85	4.77
0.005		12.83	9.43	8.08	7.34	6.87	6.54	6.30	6.12	5.97	5.85	5.75
0.050	**11**	4.84	3.98	3.59	3.36	3.20	3.09	3.01	2.95	2.90	2.85	2.82
0.025		6.72	5.26	4.63	4.28	4.04	3.88	3.76	3.66	3.59	3.53	3.47
0.010		9.65	7.21	6.22	5.67	5.32	5.07	4.89	4.74	4.63	4.54	4.46
0.005		12.23	8.91	7.60	6.88	6.42	6.10	5.86	5.68	5.54	5.42	5.32
0.050	**12**	4.75	3.89	3.49	3.26	3.11	3.00	2.91	2.85	2.80	2.75	2.72
0.025		6.55	5.10	4.47	4.12	3.89	3.73	3.61	3.51	3.44	3.37	3.32
0.010		9.33	6.93	5.95	5.41	5.06	4.82	4.64	4.50	4.39	4.30	4.22
0.005		11.75	8.51	7.23	6.52	6.07	5.76	5.52	5.35	5.20	5.09	4.99

Tabla N°5.2

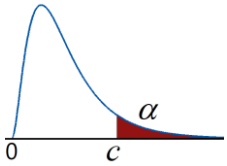


TABLA DE LA DISTRIBUCIÓN F

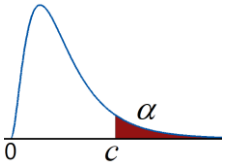
Área de la cola derecha **(α)**

v_1: grados de libertad del numerador y v_2 grados de libertad del denominador

		v_1										
α	**v_2**	**12**	**15**	**20**	**24**	**30**	**40**	**50**	**60**	**70**	**80**	**120**
0.050	**1**	243.91	245.95	248.01	249.05	250.10	251.14	251.77	252.20	252.50	252.72	253.25
0.025		976.71	984.87	993.10	997.25	1001.41	1005.60	1008.12	1009.80	1011.00	1011.91	1014.02
0.010		6106.32	6157.28	6208.73	6234.63	6260.65	6286.78	6302.52	6313.03	6320.55	6326.20	6339.39
0.005		24426.37	24630.21	24835.97	24939.57	25043.63	25148.15	25211.09	25253.14	25283.22	25305.80	25358.57
0.050	**2**	19.41	19.43	19.45	19.45	19.46	19.47	19.48	19.48	19.48	19.48	19.49
0.025		39.41	39.43	39.45	39.46	39.46	39.47	39.48	39.48	39.48	39.49	39.49
0.010		99.42	99.43	99.45	99.46	99.47	99.47	99.48	99.48	99.48	99.49	99.49
0.005		199.42	199.43	199.45	199.46	199.47	199.47	199.48	199.48	199.49	199.49	199.49
0.050	**3**	8.74	8.70	8.66	8.64	8.62	8.59	8.58	8.57	8.57	8.56	8.55
0.025		14.34	14.25	14.17	14.12	14.08	14.04	14.01	13.99	13.98	13.97	13.95
0.010		27.05	26.87	26.69	26.60	26.50	26.41	26.35	26.32	26.29	26.27	26.22
0.005		43.39	43.08	42.78	42.62	42.47	42.31	42.21	42.15	42.10	42.07	41.99
0.050	**4**	5.91	5.86	5.80	5.77	5.75	5.72	5.70	5.69	5.68	5.67	5.66
0.025		8.75	8.66	8.56	8.51	8.46	8.41	8.38	8.36	8.35	8.33	8.31
0.010		14.37	14.20	14.02	13.93	13.84	13.75	13.69	13.65	13.63	13.61	13.56
0.005		20.70	20.44	20.17	20.03	19.89	19.75	19.67	19.61	19.57	19.54	19.47
0.050	**5**	4.68	4.62	4.56	4.53	4.50	4.46	4.44	4.43	4.42	4.41	4.40
0.025		6.52	6.43	6.33	6.28	6.23	6.18	6.14	6.12	6.11	6.10	6.07
0.010		9.89	9.72	9.55	9.47	9.38	9.29	9.24	9.20	9.18	9.16	9.11
0.005		13.38	13.15	12.90	12.78	12.66	12.53	12.45	12.40	12.37	12.34	12.27
0.050	**6**	4.00	3.94	3.87	3.84	3.81	3.77	3.75	3.74	3.73	3.72	3.70
0.025		5.37	5.27	5.17	5.12	5.07	5.01	4.98	4.96	4.94	4.93	4.90
0.010		7.72	7.56	7.40	7.31	7.23	7.14	7.09	7.06	7.03	7.01	6.97
0.005		10.03	9.81	9.59	9.47	9.36	9.24	9.17	9.12	9.09	9.06	9.00
0.050	**7**	3.57	3.51	3.44	3.41	3.38	3.34	3.32	3.30	3.29	3.29	3.27
0.025		4.67	4.57	4.47	4.41	4.36	4.31	4.28	4.25	4.24	4.23	4.20
0.010		6.47	6.31	6.16	6.07	5.99	5.91	5.86	5.82	5.80	5.78	5.74
0.005		8.18	7.97	7.75	7.64	7.53	7.42	7.35	7.31	7.28	7.25	7.19
0.050	**8**	3.28	3.22	3.15	3.12	3.08	3.04	3.02	3.01	2.99	2.99	2.97
0.025		4.20	4.10	4.00	3.95	3.89	3.84	3.81	3.78	3.77	3.76	3.73
0.010		5.67	5.52	5.36	5.28	5.20	5.12	5.07	5.03	5.01	4.99	4.95
0.005		7.01	6.81	6.61	6.50	6.40	6.29	6.22	6.18	6.15	6.12	6.06
0.050	**9**	3.07	3.01	2.94	2.90	2.86	2.83	2.80	2.79	2.78	2.77	2.75
0.025		3.87	3.77	3.67	3.61	3.56	3.51	3.47	3.45	3.43	3.42	3.39
0.010		5.11	4.96	4.81	4.73	4.65	4.57	4.52	4.48	4.46	4.44	4.40
0.005		6.23	6.03	5.83	5.73	5.62	5.52	5.45	5.41	5.38	5.36	5.30
0.050	**10**	2.91	2.85	2.77	2.74	2.70	2.66	2.64	2.62	2.61	2.60	2.58
0.025		3.62	3.52	3.42	3.37	3.31	3.26	3.22	3.20	3.18	3.17	3.14
0.010		4.71	4.56	4.41	4.33	4.25	4.17	4.12	4.08	4.06	4.04	4.00
0.005		5.66	5.47	5.27	5.17	5.07	4.97	4.90	4.86	4.83	4.80	4.75
0.050	**11**	2.79	2.72	2.65	2.61	2.57	2.53	2.51	2.49	2.48	2.47	2.45
0.025		3.43	3.33	3.23	3.17	3.12	3.06	3.03	3.00	2.99	2.97	2.94
0.010		4.40	4.25	4.10	4.02	3.94	3.86	3.81	3.78	3.75	3.73	3.69
0.005		5.24	5.05	4.86	4.76	4.65	4.55	4.49	4.45	4.41	4.39	4.34
0.050	**12**	2.69	2.62	2.54	2.51	2.47	2.43	2.40	2.38	2.37	2.36	2.34
0.025		3.28	3.18	3.07	3.02	2.96	2.91	2.87	2.85	2.83	2.82	2.79
0.010		4.16	4.01	3.86	3.78	3.70	3.62	3.57	3.54	3.51	3.49	3.45
0.005		4.91	4.72	4.53	4.43	4.33	4.23	4.17	4.12	4.09	4.07	4.01

Tabla N°5.3

TABLA DE LA DISTRIBUCIÓN F



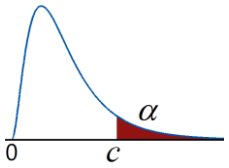
Área de la cola derecha **(α)**

v_1: grados de libertad del numerador y v_2 grados de libertad del denominador

		v_1										
α	**v_2**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**
0.050	**13**	4.67	3.81	3.41	3.18	3.03	2.92	2.83	2.77	2.71	2.67	2.63
0.025		6.41	4.97	4.35	4.00	3.77	3.60	3.48	3.39	3.31	3.25	3.20
0.010		9.07	6.70	5.74	5.21	4.86	4.62	4.44	4.30	4.19	4.10	4.02
0.005		11.37	8.19	6.93	6.23	5.79	5.48	5.25	5.08	4.94	4.82	4.72
0.050	**14**	4.60	3.74	3.34	3.11	2.96	2.85	2.76	2.70	2.65	2.60	2.57
0.025		6.30	4.86	4.24	3.89	3.66	3.50	3.38	3.29	3.21	3.15	3.09
0.010		8.86	6.51	5.56	5.04	4.69	4.46	4.28	4.14	4.03	3.94	3.86
0.005		11.06	7.92	6.68	6.00	5.56	5.26	5.03	4.86	4.72	4.60	4.51
0.050	**15**	4.54	3.68	3.29	3.06	2.90	2.79	2.71	2.64	2.59	2.54	2.51
0.025		6.20	4.77	4.15	3.80	3.58	3.41	3.29	3.20	3.12	3.06	3.01
0.010		8.68	6.36	5.42	4.89	4.56	4.32	4.14	4.00	3.89	3.80	3.73
0.005		10.80	7.70	6.48	5.80	5.37	5.07	4.85	4.67	4.54	4.42	4.33
0.050	**20**	4.35	3.49	3.10	2.87	2.71	2.60	2.51	2.45	2.39	2.35	2.31
0.025		5.87	4.46	3.86	3.51	3.29	3.13	3.01	2.91	2.84	2.77	2.72
0.010		8.10	5.85	4.94	4.43	4.10	3.87	3.70	3.56	3.46	3.37	3.29
0.005		9.94	6.99	5.82	5.17	4.76	4.47	4.26	4.09	3.96	3.85	3.76
0.050	**24**	4.26	3.40	3.01	2.78	2.62	2.51	2.42	2.36	2.30	2.25	2.22
0.025		5.72	4.32	3.72	3.38	3.15	2.99	2.87	2.78	2.70	2.64	2.59
0.010		7.82	5.61	4.72	4.22	3.90	3.67	3.50	3.36	3.26	3.17	3.09
0.005		9.55	6.66	5.52	4.89	4.49	4.20	3.99	3.83	3.69	3.59	3.50
0.050	**30**	4.17	3.32	2.92	2.69	2.53	2.42	2.33	2.27	2.21	2.16	2.13
0.025		5.57	4.18	3.59	3.25	3.03	2.87	2.75	2.65	2.57	2.51	2.46
0.010		7.56	5.39	4.51	4.02	3.70	3.47	3.30	3.17	3.07	2.98	2.91
0.005		9.18	6.35	5.24	4.62	4.23	3.95	3.74	3.58	3.45	3.34	3.25
0.050	**40**	4.08	3.23	2.84	2.61	2.45	2.34	2.25	2.18	2.12	2.08	2.04
0.025		5.42	4.05	3.46	3.13	2.90	2.74	2.62	2.53	2.45	2.39	2.33
0.010		7.31	5.18	4.31	3.83	3.51	3.29	3.12	2.99	2.89	2.80	2.73
0.005		8.83	6.07	4.98	4.37	3.99	3.71	3.51	3.35	3.22	3.12	3.03
0.050	**45**	4.06	3.20	2.81	2.58	2.42	2.31	2.22	2.15	2.10	2.05	2.01
0.025		5.38	4.01	3.42	3.09	2.86	2.70	2.58	2.49	2.41	2.35	2.29
0.010		7.23	5.11	4.25	3.77	3.45	3.23	3.07	2.94	2.83	2.74	2.67
0.005		8.71	5.97	4.89	4.29	3.91	3.64	3.43	3.28	3.15	3.04	2.96
0.050	**50**	4.03	3.18	2.79	2.56	2.40	2.29	2.20	2.13	2.07	2.03	1.99
0.025		5.34	3.97	3.39	3.05	2.83	2.67	2.55	2.46	2.38	2.32	2.26
0.010		7.17	5.06	4.20	3.72	3.41	3.19	3.02	2.89	2.78	2.70	2.63
0.005		8.63	5.90	4.83	4.23	3.85	3.58	3.38	3.22	3.09	2.99	2.90
0.050	**60**	4.00	3.15	2.76	2.53	2.37	2.25	2.17	2.10	2.04	1.99	1.95
0.025		5.29	3.93	3.34	3.01	2.79	2.63	2.51	2.41	2.33	2.27	2.22
0.010		7.08	4.98	4.13	3.65	3.34	3.12	2.95	2.82	2.72	2.63	2.56
0.005		8.49	5.79	4.73	4.14	3.76	3.49	3.29	3.13	3.01	2.90	2.82
0.050	**70**	3.98	3.13	2.74	2.50	2.35	2.23	2.14	2.07	2.02	1.97	1.93
0.025		5.25	3.89	3.31	2.97	2.75	2.59	2.47	2.38	2.30	2.24	2.18
0.010		7.01	4.92	4.07	3.60	3.29	3.07	2.91	2.78	2.67	2.59	2.51
0.005		8.40	5.72	4.66	4.08	3.70	3.43	3.23	3.08	2.95	2.85	2.76
0.050	**120**	3.92	3.07	2.68	2.45	2.29	2.18	2.09	2.02	1.96	1.91	1.87
0.025		5.15	3.80	3.23	2.89	2.67	2.52	2.39	2.30	2.22	2.16	2.10
0.010		6.85	4.79	3.95	3.48	3.17	2.96	2.79	2.66	2.56	2.47	2.40
0.005		8.18	5.54	4.50	3.92	3.55	3.28	3.09	2.93	2.81	2.71	2.62

Tabla N°5.4

TABLA DE LA DISTRIBUCIÓN F



Área de la cola derecha **(α)**

v_1: grados de libertad del numerador y v_2 grados de libertad del denominador

		v_1										
α	**v_2**	**12**	**15**	**20**	**24**	**30**	**40**	**50**	**60**	**70**	**80**	**120**
0.050	**13**	2.60	2.53	2.46	2.42	2.38	2.34	2.31	2.30	2.28	2.27	2.25
0.025		3.15	3.05	2.95	2.89	2.84	2.78	2.74	2.72	2.70	2.69	2.66
0.010		3.96	3.82	3.66	3.59	3.51	3.43	3.38	3.34	3.32	3.30	3.25
0.005		4.64	4.46	4.27	4.17	4.07	3.97	3.91	3.87	3.84	3.81	3.76
0.050	**14**	2.53	2.46	2.39	2.35	2.31	2.27	2.24	2.22	2.21	2.20	2.18
0.025		3.05	2.95	2.84	2.79	2.73	2.67	2.64	2.61	2.60	2.58	2.55
0.010		3.80	3.66	3.51	3.43	3.35	3.27	3.22	3.18	3.16	3.14	3.09
0.005		4.43	4.25	4.06	3.96	3.86	3.76	3.70	3.66	3.62	3.60	3.55
0.050	**15**	2.48	2.40	2.33	2.29	2.25	2.20	2.18	2.16	2.15	2.14	2.11
0.025		2.96	2.86	2.76	2.70	2.64	2.59	2.55	2.52	2.51	2.49	2.46
0.010		3.67	3.52	3.37	3.29	3.21	3.13	3.08	3.05	3.02	3.00	2.96
0.005		4.25	4.07	3.88	3.79	3.69	3.58	3.52	3.48	3.45	3.43	3.37
0.050	**20**	2.28	2.20	2.12	2.08	2.04	1.99	1.97	1.95	1.93	1.92	1.90
0.025		2.68	2.57	2.46	2.41	2.35	2.29	2.25	2.22	2.20	2.19	2.16
0.010		3.23	3.09	2.94	2.86	2.78	2.69	2.64	2.61	2.58	2.56	2.52
0.005		3.68	3.50	3.32	3.22	3.12	3.02	2.96	2.92	2.88	2.86	2.81
0.050	**24**	2.18	2.11	2.03	1.98	1.94	1.89	1.86	1.84	1.83	1.82	1.79
0.025		2.54	2.44	2.33	2.27	2.21	2.15	2.11	2.08	2.06	2.05	2.01
0.010		3.03	2.89	2.74	2.66	2.58	2.49	2.44	2.40	2.38	2.36	2.31
0.005		3.42	3.25	3.06	2.97	2.87	2.77	2.70	2.66	2.63	2.60	2.55
0.050	**30**	2.09	2.01	1.93	1.89	1.84	1.79	1.76	1.74	1.72	1.71	1.68
0.025		2.41	2.31	2.20	2.14	2.07	2.01	1.97	1.94	1.92	1.90	1.87
0.010		2.84	2.70	2.55	2.47	2.39	2.30	2.25	2.21	2.18	2.16	2.11
0.005		3.18	3.01	2.82	2.73	2.63	2.52	2.46	2.42	2.38	2.36	2.30
0.050	**40**	2.00	1.92	1.84	1.79	1.74	1.69	1.66	1.64	1.62	1.61	1.58
0.025		2.29	2.18	2.07	2.01	1.94	1.88	1.83	1.80	1.78	1.76	1.72
0.010		2.66	2.52	2.37	2.29	2.20	2.11	2.06	2.02	1.99	1.97	1.92
0.005		2.95	2.78	2.60	2.50	2.40	2.30	2.23	2.18	2.15	2.12	2.06
0.050	**45**	1.97	1.89	1.81	1.76	1.71	1.66	1.63	1.60	1.59	1.57	1.54
0.025		2.25	2.14	2.03	1.96	1.90	1.83	1.79	1.76	1.74	1.72	1.68
0.010		2.61	2.46	2.31	2.23	2.14	2.05	2.00	1.96	1.93	1.91	1.85
0.005		2.88	2.71	2.53	2.43	2.33	2.22	2.16	2.11	2.08	2.05	1.99
0.050	**50**	1.95	1.87	1.78	1.74	1.69	1.63	1.60	1.58	1.56	1.54	1.51
0.025		2.22	2.11	1.99	1.93	1.87	1.80	1.75	1.72	1.70	1.68	1.64
0.010		2.56	2.42	2.27	2.18	2.10	2.01	1.95	1.91	1.88	1.86	1.80
0.005		2.82	2.65	2.47	2.37	2.27	2.16	2.10	2.05	2.02	1.99	1.93
0.050	**60**	1.92	1.84	1.75	1.70	1.65	1.59	1.56	1.53	1.52	1.50	1.47
0.025		2.17	2.06	1.94	1.88	1.82	1.74	1.70	1.67	1.64	1.63	1.58
0.010		2.50	2.35	2.20	2.12	2.03	1.94	1.88	1.84	1.81	1.78	1.73
0.005		2.74	2.57	2.39	2.29	2.19	2.08	2.01	1.96	1.93	1.90	1.83
0.050	**70**	1.89	1.81	1.72	1.67	1.62	1.57	1.53	1.50	1.49	1.47	1.44
0.025		2.14	2.03	1.91	1.85	1.78	1.71	1.66	1.63	1.60	1.59	1.54
0.010		2.45	2.31	2.15	2.07	1.98	1.89	1.83	1.78	1.75	1.73	1.67
0.005		2.68	2.51	2.33	2.23	2.13	2.02	1.95	1.90	1.86	1.84	1.77
0.050	**120**	1.83	1.75	1.66	1.61	1.55	1.50	1.46	1.43	1.41	1.39	1.35
0.025		2.05	1.94	1.82	1.76	1.69	1.61	1.56	1.53	1.50	1.48	1.43
0.010		2.34	2.19	2.03	1.95	1.86	1.76	1.70	1.66	1.62	1.60	1.53
0.005		2.54	2.37	2.19	2.09	1.98	1.87	1.80	1.75	1.71	1.68	1.61