Tablas de Probabilidades

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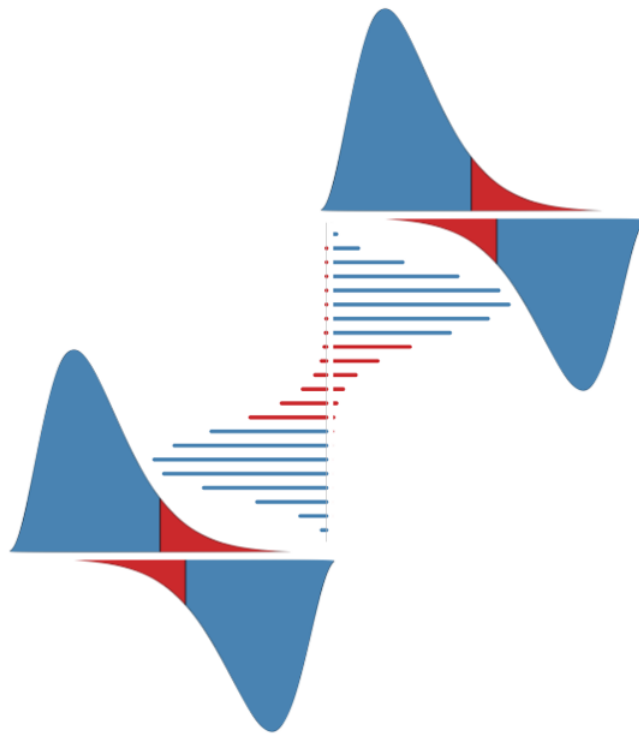
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Versión 1.00

Notas

La idea de elaborar unas tablas de probabilidades surgió del afán de uniformar las tablas empleadas dentro de un mismo curso y entre distintos cursos. Para esto se construyeron las tablas de los cursos Estadística I, Estadística II e Inferencia Estadística, con el mismo contenido de las empleadas oficialmente. Se incluyeron los mismos formularios y distribuciones de probabilidad.

Con las primeras versiones de las tablas nos dimos cuenta de las ventajas de contar con el correspondiente documento electrónico. Se puede extraer exclusivamente el material de interés e incluirlo en otro documento.

Así pues, en este trabajo hemos compilado los formularios y las tablas de probabilidades utilizadas en los cursos mencionados y algunas distribuciones más para apoyo de cursos optativos.

El cálculo de las probabilidades y las gráficas fueron generadas utilizando el lenguaje estadístico R. Para algunas distribuciones se programaron los correspondientes algoritmos que en un caso implicó incluso la liga de R con FORTRAN.
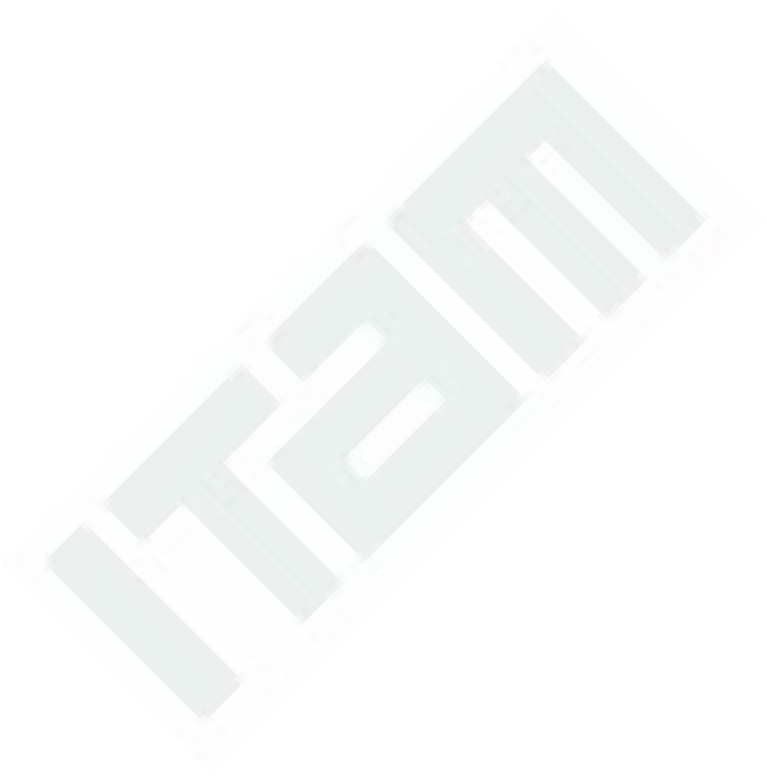
El documento fue preparado con LATEX y el uso del paquete-R *xtable*.

Si tiene algún comentario agradeceremos que nos lo haga llegar a: `ebarrios at itam.mx`.

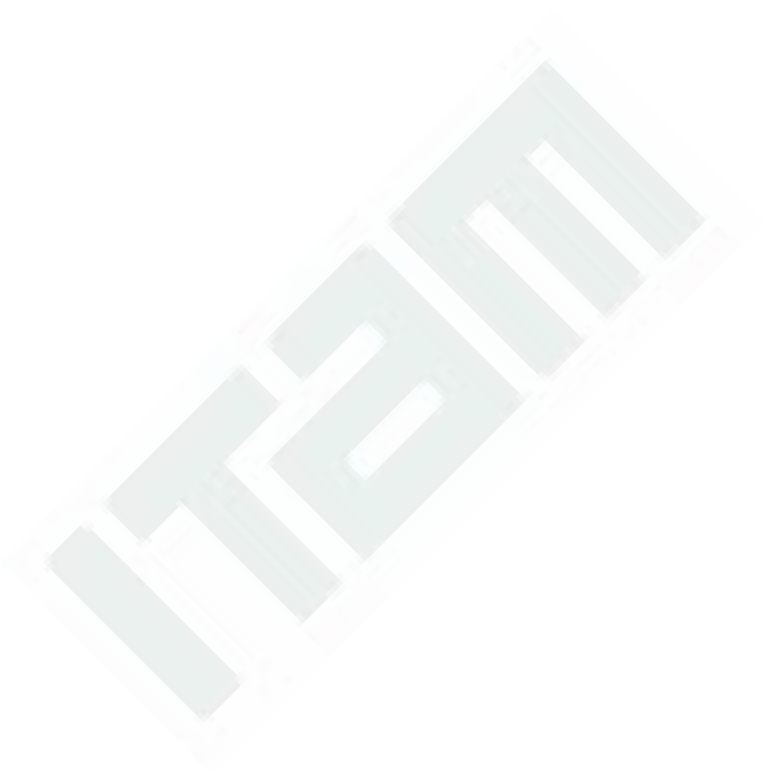Copia electrónica de este documento y sus actualizaciones las encontrará en
http://allman.rhon.itam.mx/~ebarrios/TablasProbabilidad

Índice

Parte I
Formularios

1. Estadística I

1.1. Análisis exploratorio de datos

• **Datos no agrupados**

Medida descriptiva	Población	Muestra
Media	$\mu = \dfrac{1}{N}\sum_{i=1}^{N} x_i$	$\bar{x} = \dfrac{1}{n}\sum_{i=1}^{n} x_i$
Mediana*	$\ell(m_d) = 0.5N + 0.5$	$\ell(\tilde{x}) = 0.5n + 0.5$
Cuartil inferior*	$\ell(Q_1) = 0.25N + 0.5$	$\ell(q_1) = 0.25n + 0.5$
Cuartil superior*	$\ell(Q_3) = 0.75N + 0.5$	$\ell(q_3) = 0.75n + 0.5$
Amplitud intercuartílica	$A.I. = Q_3 - Q_1$	$a.i. = q_3 - q_1$
Desviación media a mediana	$D.M. = \dfrac{1}{N}\sum_{i=1}^{N} |x_i - m_d|$	$d.m. = \dfrac{1}{n-1}\sum_{i=1}^{n} |x_i - \tilde{x}|$
Varianza	$\sigma^2 = \dfrac{1}{N}\sum_{i=1}^{N}(x_i - \mu_x)^2$ $= \dfrac{1}{N}\sum_{i=1}^{N} x_i^2 - N\mu^2$	$s^2 = \dfrac{1}{n-1}\sum_{i=1}^{n}(x_i - \bar{x})^2$ $= \dfrac{1}{n-1}\left(\sum_{i=1}^{n} x_i^2 - n\bar{x}^2\right)$
Coeficiente de variación	$C.V. = \dfrac{\sigma}{\mu}$	$c.v. = \dfrac{s}{\bar{x}}$
Covarianza	$\sigma_{xy} = \dfrac{1}{N}\sum_{i=1}^{N}(x_i - \mu_X)(y_i - \mu_Y)$ $= \dfrac{1}{N}\sum_{i=1}^{N} x_i y_i - \mu_Y\mu_Y$	$s_{xy} = \dfrac{1}{n-1}\sum_{i=1}^{n}(x_i - \bar{x})(y_i - \bar{y})$ $= \dfrac{1}{n-1}\left(\sum_{i=1}^{n} x_i y_i - n\bar{x}\bar{y}\right)$
Coeficiente de correlación	$\rho = \dfrac{\sigma_{xy}}{\sigma_x \sigma_y}$	$r = \dfrac{s_{xy}}{s_x s_y}$

x_i: i-ésima observación de la variable X.
N: número de elementos en la población.
n: número de observaciones en la muestra.
$\ell(q)$:   posición o índice de q, redondeado.
m_d: mediana poblacional.
$\tilde{x}$:   mediana muestral.
* Determinadas por la l-ésima observación de la población o muestra ordenada.

- **Datos agrupados**

Medida descriptiva	Población	Muestra
Media	$\mu = \dfrac{1}{N} \sum_{i=1}^{k} f_i m_i$	$\bar{x} = \dfrac{1}{n} \sum_{i=1}^{k} f_i m_i$
Mediana	$m_d = A + \dfrac{0.5 - C}{D}(B - A)$	$\tilde{x} = A + \dfrac{0.5 - C}{D}(B - A)$
Desviación media a mediana	$D.M. = \dfrac{1}{N} \sum_{i=1}^{k} f_i \lvert m_i - m_d \rvert$	$d.m. = \dfrac{1}{n-1} \sum_{i=1}^{k} f_i \lvert m_i - \tilde{x} \rvert$
Varianza	$\sigma^2 = \dfrac{1}{N} \sum_{i=1}^{k} f_i (m_i - \mu)^2$ $= \dfrac{1}{N} \sum_{i=1}^{k} f_i m_i^2 - N^2 \mu^2$	$s^2 = \dfrac{1}{n-1} \sum_{i=1}^{k} f_i (m_i - \bar{x})^2$ $= \dfrac{1}{n-1} \sum_{i=1}^{k} f_i m_i^2 - n^2 \bar{x}^2$

- f_i: frecuencia absoluta de la i-ésima clase.
- k: número de clases en la distribución de frecuencias.
- m_i: marca de la i-ésima clase.
- A: frontera inferior del intervalo de clase que contiene a la mediana.
- B: frontera superior del intervalo de clase que contiene a la mediana.
- C: frecuencia relativa acumulada hasta la clase anterior a la que contiene a la mediana.
- D: frecuencia relativa de la clase que contiene a la mediana.

1.2. Variables aleatorias

- **Esperanza, varianza y covarianza**

	Discretas	Continuas
$\mu = \mathrm{E}(X)$	$\displaystyle\sum_{x \in R_X} x P(X = x)$	$\displaystyle\int_{R_X} x f_X(x) dx$
$\sigma^2 = \mathrm{var}(X)$	$\displaystyle\sum_{x \in R_X} (x - \mu)^2 P(X = x)$	$\displaystyle\int_{R_X} (x - \mu)^2 f_X(x) dx$
$\sigma_{XY} = \mathrm{Cov}(X, Y)$	$\displaystyle\sum_{x \in R_X} \sum_{y \in R_Y} xy P(X = x, Y = y)$ $\displaystyle- \sum_{x \in R_X} x P(X = x) \sum_{y \in R_Y} y P(Y = y)$	$\displaystyle\int_{R_X} \int_{R_Y} xy f(x, y) dy dx$ $\displaystyle- \int_{R_X} x f_X(x) dx \int_{R_Y} y f_Y(y) dy$

• **Propiedades**

$$
\begin{aligned}
\mathrm{E}(aX + b) &= a\mathrm{E}(X) + b \\
\mathrm{var}(X) &= \mathrm{E}\left[(X - \mathrm{E}(X))^2\right] \\
&= \mathrm{E}(X^2) - \mathrm{E}(X)^2 \\
\mathrm{var}\,(aX + bY) &= a^2\mathrm{var}(X) + b^2\mathrm{var}(Y) \\
&\quad + 2ab\mathrm{Cov}(X,Y)
\end{aligned}
$$

$$
\begin{aligned}
\mathrm{Cov}(X,Y) &= \mathrm{E}\left[(X - \mathrm{E}(X))(Y - \mathrm{E}(Y))\right] \\
&= \mathrm{E}(XY) - \mathrm{E}(X)\mathrm{E}(Y) \\
\mathrm{Cov}(aX + b, cY + d) &= ac\mathrm{Cov}(X,Y) \\
\rho = \mathrm{Corr}(X,Y) &= \frac{\sigma_{XY}}{\sigma_X \sigma_Y}
\end{aligned}
$$

1.3.   Algunas distribuciones de probabilidad

Distribución	Notación	Soporte R_X	Función de probabilidad	E(X)	var(X)
Uniforme discreta	$\mathrm{Unif}\{x_1, \ldots, x_K\}$	$x \in \{x_1, \ldots, x_K\}$	$\frac{1}{K}$	$\frac{1}{K}\sum_{i=1}^{K} x_i$	$\frac{1}{K}\sum_{i=1}^{K}(x_i - E(X))^2$
Bernoulli	$\mathrm{Be}(p)$	$x \in \{0,1\}$	$p^x(1-p)^{1-x}$	p	$p(1-p)$
Binomial	$\mathrm{Bin}(n,p)$	$x \in \{0,1,\ldots,n\}$	$\binom{n}{x}p^x(1-p)^{n-x}$	np	$np(1-p)$
Poisson	$\mathrm{Po}(\lambda)$	$x \in \{0,1,2,\ldots\}$	$\frac{\lambda^x e^{-\lambda}}{x!}$	λ	λ
Uniforme continua	$\mathrm{Unif}(a,b)$	$a \le x \le b$	$\frac{1}{b-a}$	$\frac{a+b}{2}$	$\frac{(b-a)^2}{12}$
Normal	$\mathrm{N}(\mu,\sigma^2)$	$-\infty < x < \infty$	$\frac{1}{\sigma\sqrt{2\pi}}\exp\left\{-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2\right\}$	μ	σ^2
Exponencial	$\mathrm{Exp}(\theta)$	$0 \le x < \infty$	$\frac{1}{\theta}\exp\{-\frac{x}{\theta}\}$	θ	θ^2

2. Estadística II

2.1. Algunas distribuciones de probabilidad

Distribución	Notación	Soporte R_X	Función de probabilidad	E(X)	var(X)
Uniforme discreta	$\text{Unif}\{x_1, \ldots, x_K\}$	$x \in \{x_1, \ldots, x_K\}$	$\frac{1}{K}$	$\frac{1}{K}\sum_{i=1}^{K} x_i$	$\frac{1}{K}\sum_{i=1}^{K}(x_i - E(X))^2$
Bernoulli	$\text{Be}(p)$	$x \in \{0, 1\}$	$p^x(1-p)^{1-x}$	p	$p(1-p)$
Binomial	$\text{Bin}(n, p)$	$x \in \{0, 1, \ldots, n\}$	$\binom{n}{x}p^x(1-p)^{n-x}$	np	$np(1-p)$
Poisson	$\text{Po}(\lambda)$	$x \in \{0, 1, 2, \ldots\}$	$\frac{\lambda^x e^{-\lambda}}{x!}$	λ	λ
Uniforme continua	$\text{Unif}(a, b)$	$a \leq x \leq b$	$\frac{1}{b-a}$	$\frac{a+b}{2}$	$\frac{(b-a)^2}{12}$
Normal	$\text{N}(\mu, \sigma^2)$	$-\infty < x < \infty$	$\frac{1}{\sigma\sqrt{2\pi}}\exp\left\{-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2\right\}$	μ	σ^2
Exponencial	$\text{Exp}(\theta)$	$0 \leq x < \infty$	$\frac{1}{\theta}\exp\{-\frac{x}{\theta}\}$	θ	θ^2

2.2. Estimación puntual

Parámetro	Estimador
Media	$\bar{X} = \frac{1}{n}\sum X_i$
Varianza	$S^2 = \frac{\sum(X_i - \bar{X})^2}{n-1}$
Correlación	$r = \frac{S_{XY}}{S_X S_Y}, \quad S_{XY} = \frac{\sum(X_i - \bar{X})(Y_i - \bar{Y})}{n-1}$

Sesgo	$B(\hat{\theta}) = \text{E}(\hat{\theta} - \theta)$
Error de estimación	$|\hat{\theta} - \theta|$
Error Cuadrático Medio	$ECM(\hat{\theta}) = \text{E}\left((\hat{\theta} - \theta)^2\right)$
	$= \text{var}(\hat{\theta}) + B(\hat{\theta})^2$

2.3. Algunos estadísticos y su distribución de muestreo

Poblaciones con distribución normal

Estadístico	Distribución
$Z = \dfrac{\sqrt{n}(\bar{X} - \mu)}{\sigma}$	$Z \sim \mathrm{N}(0,1)$
$\tau = \dfrac{\sqrt{n}(\bar{X} - \mu)}{S}$	$\tau \sim t_{n-1}$
$Z = \dfrac{(\bar{X}_1 - \bar{X}_2) - (\mu_1 - \mu_2)}{\sqrt{\dfrac{\sigma_1^2}{n_1} + \dfrac{\sigma_2^2}{n_2}}}$	$Z \sim \mathrm{N}(0,1)$
$S_p^2 = \dfrac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{(n_1 + n_2 - 2)}$	$\dfrac{(n_1 + n_2 - 2)S_p^2}{\sigma^2} \sim \chi^2_{n_1 + n_2 - 2}$
$\tau = \dfrac{(\bar{X}_1 - \bar{X}_2) - (\mu_1 - \mu_2)}{\sqrt{S_p^2 \left(\dfrac{1}{n_1} + \dfrac{1}{n_2} \right)}}$	$\tau \sim t_{(n_1 + n_2 - 2)}$
$J = \dfrac{(n-1)S^2}{\sigma^2}$	$J \sim \chi^2_{n-1}$
$F = \dfrac{S_1^2 / \sigma_1^2}{S_2^2 / \sigma_2^2}$	$F \sim F_{(n_1 - 1, n_2 - 1)}$
$\tau = \dfrac{\sqrt{n}(\bar{D} - \mu_D)}{S_D}, \qquad D = X_1 - X_2$	$\tau \sim t_{n-1}$
$\tau = \dfrac{r\sqrt{n-2}}{\sqrt{1 - r^2}}, \qquad r = \dfrac{S_{XY}}{S_X S_Y}$	$\tau \sim t_{n-2}$

Poblaciones con distribución Bernoulli

Estadístico	Distribución
$Y = n\hat{p}$	$Y \sim \text{Bin}(n, p)$
$Z = \dfrac{\hat{p} - p}{\sqrt{p(1-p)/n}}$	$Z \sim \text{N}(0,1)$, para n grande
$Z = \dfrac{(\hat{p}_1 - \hat{p}_2) - (p_1 - p_2)}{\sqrt{\hat{p}_1(1-\hat{p}_1)/n_1 + \hat{p}_2(1-\hat{p}_2)/n_2}}$	$Z \sim \text{N}(0,1)$, para n_1 y n_2 grandes
Si $p_1 = p_2$, $$Z = \dfrac{(\hat{p}_1 - \hat{p}_2) - (p_1 - p_2)}{\sqrt{\hat{p}(1-\hat{p})\left(\dfrac{1}{n_1} + \dfrac{1}{n_2}\right)}}$$ con $\hat{p} = \dfrac{n_1\hat{p}_1 + n_2\hat{p}_2}{n_1 + n_2}$	$Z \sim \text{N}(0,1)$, para n_1 y n_2 grandes

2.4. Pruebas no paramétricas

Prueba	Estadístico	Propiedades
Signos	$M = \#$ de signos positivos	$\text{E}(M) = np, \quad \text{var}(M) = np(1-p)$
Mann-Whitney	$T_x = \sum R(X_i) - \dfrac{n(n+1)}{2}$	$\text{E}(T_x) = \dfrac{nm}{2}, \quad \text{var}(T_x) = \dfrac{nm(n+m+1)}{12}$
Correlación de Spearman	$r_s = 1 - \dfrac{6\sum d_i^2}{n^3 - n}$	$r_s\sqrt{(n-1)} \sim \text{N}(0,1)$, para n grande
Ji–cuadrada (χ^2)	$J = \displaystyle\sum_{i=1}^{rc} \dfrac{(\text{Obs}_i - \text{Esp}_i)^2}{\text{Esp}_i}$	$J \sim \chi^2_{(r-1)(c-1)}, \quad \begin{matrix} r = \# \text{ renglones} \\ c = \# \text{ columnas} \end{matrix}$

3.   Probabilidad, Inferencia Estadística y Econometría

3.1.   Variables aleatorias

- **Valor esperado de $g(X)$**

$$\mathrm{E}(g(X)) = \begin{cases} \displaystyle\sum_x g(x)P(X=x) & \text{caso discreto} \\[2em] \displaystyle\int_{-\infty}^{\infty} g(x)f_X(x)dx & \text{caso continuo} \end{cases}$$

- **Propiedades de la función generadora de momentos**

$$M_{X+a}(t) = e^{at}M_X(t)$$
$$M_{bX}(t) = M_X(bt)$$
$$M_{\frac{X+a}{b}}(t) = e^{\frac{a}{b}t}M_X\left(\frac{t}{b}\right)$$

- **Tercer y cuarto momentos con respecto a la media**

$$\mathrm{E}[(X-\mu)^3] = \mathrm{E}(X^3) - 3\mathrm{E}(X)\mathrm{E}(X^2) + 2(\mathrm{E}(X))^3$$

$$\mathrm{E}[(X-\mu)^4] = \mathrm{E}(X^4) - 4\mathrm{E}(X)\mathrm{E}(X^3) + 6(\mathrm{E}(X))^2\mathrm{E}(X^2) - 3(\mathrm{E}(X))^4$$

- **Coeficientes de asimetría y de curtosis**

$$C_A = \alpha_3 = \frac{\mu_3}{\mu_2^{3/2}}$$

$$C_K = \alpha_4 = \frac{\mu_4}{\mu_2^2}$$

- **Método de transformación de variables**

Sea $U = h(Y)$, con h función monótona creciente o decreciente en y, entonces

$$f_U(u) = f_Y(y)\left|\frac{dy}{du}\right| \qquad \text{donde } y = h^{-1}(u)$$

3.2. Distribuciones de probabilidad

Distribución	Notación	Soporte R_X	Función de probabilidad	$\mathrm{E}(X)$	$\mathrm{var}(X)$	Función generadora de momentos
Uniforme discreta	$\mathrm{Unif}\{x_1,\ldots,x_K\}$	$x \in \{x_1,\ldots,x_K\}$	$\dfrac{1}{K}$	$\dfrac{1}{K}\sum_{i=1}^{K}x_i$	$\dfrac{1}{K}\sum_{i=1}^{K}(x_i - E(X))^2$	$\dfrac{1}{k}\sum_i e^{tx_i}$
Bernoulli	$\mathrm{Be}(p)$	$x \in \{0,1\}$	$p^x(1-p)^{1-x}$	p	$p(1-p)$	$pe^t + (1-p)$
Binomial	$\mathrm{Bin}(n,p)$	$x \in \{0,1,\ldots,n\}$	$\binom{n}{x}p^x(1-p)^{n-x}$	np	$np(1-p)$	$[pe^t + (1-p)]^n$
Poisson	$\mathrm{Po}(\lambda)$	$x \in \{0,1,2,\ldots\}$	$\dfrac{\lambda^x e^{-\lambda}}{x!}$	λ	λ	$e^{\lambda(e^t-1)}$
Uniforme continua	$\mathrm{Unif}(a,b)$	$a \le x \le b$	$\dfrac{1}{b-a}$	$\dfrac{a+b}{2}$	$\dfrac{(b-a)^2}{12}$	$\dfrac{e^{tb}-e^{ta}}{t(b-a)}$
Normal	$\mathrm{N}(\mu,\sigma^2)$	$-\infty < x < \infty$	$\dfrac{1}{\sigma\sqrt{2\pi}}\exp\left\{-\dfrac{1}{2}\left(\dfrac{x-\mu}{\sigma}\right)^2\right\}$	μ	σ^2	$e^{\mu t + \frac{1}{2}\sigma^2 t^2}$
Gama*	$\mathrm{Gama}(\alpha,\beta)$	$x \in \mathcal{R}^+$	$\dfrac{x^{\alpha-1}e^{-x/\beta}}{\Gamma(\alpha)\beta^\alpha}$	$\alpha\beta$	$\alpha\beta^2$	$(1-\beta t)^{-\alpha}$

* Notas:

- $\Gamma(\alpha) = \displaystyle\int_0^\infty u^{\alpha-1}e^{-u}du$. Entonces,

  $\Gamma(\alpha+1) = \alpha\cdot\Gamma(\alpha);\quad \Gamma(1/2) = \sqrt{\pi};\quad \Gamma(1) = 1;\quad \Gamma(n+1) = n!,$ para $n = 1,2,\ldots\ldots$

- Distribución exponencial: $X \sim \mathrm{Exp}(\lambda)$. Entonces, $X \sim \mathrm{Gama}(1,1/\lambda)$ y $\mathrm{E}(X) = 1/\lambda$.

- Distribución Ji-cuadrada: $Y \sim \chi_n^2$. Entonces, $Y \sim \mathrm{Gama}(n/2,2)$ y $\mathrm{E}(Y) = n$.

3.3. Distribuciones bivariadas

- **Función de densidad condicional**

$$f(x_2|x_1) = \frac{f_{X_1,X_2}(x_1,x_2)}{f_{X_1}(x_1)}$$

- **Valor esperado de** $g(X_1,X_2)$

$$\mathrm{E}[g(X_1,X_2)] = \begin{cases} \displaystyle\sum_{x_1}\sum_{x_2} g(x_1,x_2)P(X_1=x_1,X_2=x_2) & \text{caso discreto} \\[2ex] \displaystyle\int\int g(x_1,x_2)f_{X_1,X_2}(x_1,x_2)dx_1dx_2 & \text{caso continuo} \end{cases}$$

- **Función generadora de momentos conjunta**

$$M_{X_1,X_2}(t_1,t_2) = \mathrm{E}(e^{t_1X_1+t_2X_2})$$

- **Covarianza y coeficiente de correlación**

$$\sigma_{12} = \mathrm{Cov}(X_1,X_2) = \mathrm{E}\left[(X_1-\mathrm{E}(X_1))(X_2-\mathrm{E}(X_2))\right] = \mathrm{E}(X_1X_2) - \mathrm{E}(X_1)\mathrm{E}(X_2)$$

$$\rho_{X_1X_2} = \frac{\sigma_{12}}{\sigma_1\sigma_2}$$

- **Método de transformación de variables**

Sean las variables aleatorias Y_1 y Y_2 funciones de las variables aleatorias X_1 y X_2, de manera que las ecuaciones en y_1 y y_2 tienen solución única para x_1 y x_2 en términos de y_1 y y_2. Esto es,

$$\begin{array}{ccc} y_1 = g_1(x_1,x_2) & & x_1 = h_1(y_1,y_2) \\ & y & \\ y_2 = g_2(x_1,x_2) & & x_2 = h_2(y_1,y_2) \end{array}$$

Si las funciones h_1 y h_2 tienen derivadas parciales continuas en todos los puntos (y_1,y_2) y el determinante *Jacobiano*

$$J\left(h_1(y_1,y_2),h_2(y_1,y_2)\right) = \begin{vmatrix} \dfrac{\partial h_1}{\partial y_1} & \dfrac{\partial h_1}{\partial y_2} \\[2ex] \dfrac{\partial h_2}{\partial y_1} & \dfrac{\partial h_2}{\partial y_2} \end{vmatrix} \neq 0 \quad \text{para todo } (h_1(y_1,y_2),\ h_2(y_1,y_2))$$

entonces,

$$f_{Y_1,Y_2}(y_1,y_2) = f_{X_1,X_2}\left(h_1(y_1,y_2),h_2(y_1,y_2)\right) \cdot \left|J\left(h_1(y_1,y_2),h_2(y_1,y_2)\right)\right|$$

3.4. Distribución normal bivariada

- **Función de densidad conjunta**

$$f_{X_1,X_2}(x_1,x_2) = \frac{1}{2\pi\sigma_1\sigma_2\sqrt{1-\rho^2}}\exp\left\{-\frac{1}{2(1-\rho^2)}\left[\left(\frac{x_1-\mu_1}{\sigma_1}\right)^2 - 2\rho\left(\frac{x_1-\mu_1}{\sigma_1}\right)\left(\frac{x_2-\mu_2}{\sigma_2}\right) + \left(\frac{x_2-\mu_2}{\sigma_2}\right)^2\right]\right\}$$

- **Función generadora de momentos conjunta**

$$M_{X_1,X_2}(t_1,t_2) = \exp\left\{(t_1\mu_1 + t_2\mu_2) + \frac{1}{2}\left(\sigma_1^2 t_1^2 + 2\rho\sigma_1\sigma_2 t_1 t_2 + \sigma_2^2 t_2^2\right)\right\}$$

- **Valor esperado y varianza condicionales**

$$\mathrm{E}(X_2|X_1 = x_1) = \mu_2 + \rho\frac{\sigma_2}{\sigma_1}(x_1 - \mu_1)$$

$$\mathrm{var}(X_2|X_1 = x_1) = \sigma_2^2(1 - \rho^2)$$

Parte II
Tablas de Probabilidades

4. Distribución Binomial

$$X \sim \text{Binomial}(n, p)$$

$$\text{p} = P(X \leq x) = \sum_{k=0}^{x} \binom{n}{k} p^k (1-p)^{n-k} = 1 - \alpha$$
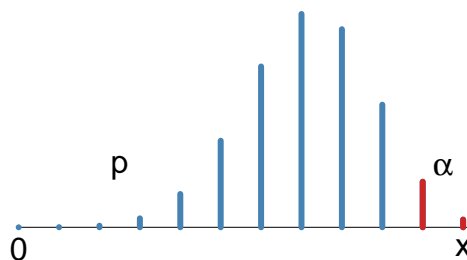
Tabla 4A. Probabilidades acumuladas p de la distribución binomial $(n = 5, 6, 7, 8, 9)$.

	x	0.01	0.05	0.1	0.2	0.25	0.3	0.4	p 0.5	0.6	0.7	0.75	0.8	0.9	0.95	0.99
$n = 5$	0	0.951	0.774	0.590	0.328	0.237	0.168	0.078	0.031	0.010	0.002	0.001	0.000	0.000	0.000	0.000
	1	0.999	0.977	0.919	0.737	0.633	0.528	0.337	0.188	0.087	0.031	0.016	0.007	0.000	0.000	0.000
	2	1.000	0.999	0.991	0.942	0.896	0.837	0.683	0.500	0.317	0.163	0.104	0.058	0.009	0.001	0.000
	3	1.000	1.000	1.000	0.993	0.984	0.969	0.913	0.813	0.663	0.472	0.367	0.263	0.081	0.023	0.001
	4	1.000	1.000	1.000	1.000	0.999	0.998	0.990	0.969	0.922	0.832	0.763	0.672	0.410	0.226	0.049
	5	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
$n = 6$	0	0.941	0.735	0.531	0.262	0.178	0.118	0.047	0.016	0.004	0.001	0.000	0.000	0.000	0.000	0.000
	1	0.999	0.967	0.886	0.655	0.534	0.420	0.233	0.109	0.041	0.011	0.005	0.002	0.000	0.000	0.000
	2	1.000	0.998	0.984	0.901	0.831	0.744	0.544	0.344	0.179	0.070	0.038	0.017	0.001	0.000	0.000
	3	1.000	1.000	0.999	0.983	0.962	0.930	0.821	0.656	0.456	0.256	0.169	0.099	0.016	0.002	0.000
	4	1.000	1.000	1.000	0.998	0.995	0.989	0.959	0.891	0.767	0.580	0.466	0.345	0.114	0.033	0.001
	5	1.000	1.000	1.000	1.000	1.000	0.999	0.996	0.984	0.953	0.882	0.822	0.738	0.469	0.265	0.059
	6	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
$n = 7$	0	0.932	0.698	0.478	0.210	0.133	0.082	0.028	0.008	0.002	0.000	0.000	0.000	0.000	0.000	0.000
	1	0.998	0.956	0.850	0.577	0.445	0.329	0.159	0.063	0.019	0.004	0.001	0.000	0.000	0.000	0.000
	2	1.000	0.996	0.974	0.852	0.756	0.647	0.420	0.227	0.096	0.029	0.013	0.005	0.000	0.000	0.000
	3	1.000	1.000	0.997	0.967	0.929	0.874	0.710	0.500	0.290	0.126	0.071	0.033	0.003	0.000	0.000
	4	1.000	1.000	1.000	0.995	0.987	0.971	0.904	0.773	0.580	0.353	0.244	0.148	0.026	0.004	0.000
	5	1.000	1.000	1.000	1.000	0.999	0.996	0.981	0.938	0.841	0.671	0.555	0.423	0.150	0.044	0.002
	6	1.000	1.000	1.000	1.000	1.000	1.000	0.998	0.992	0.972	0.918	0.867	0.790	0.522	0.302	0.068
	7	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
$n = 8$	0	0.923	0.663	0.430	0.168	0.100	0.058	0.017	0.004	0.001	0.000	0.000	0.000	0.000	0.000	0.000
	1	0.997	0.943	0.813	0.503	0.367	0.255	0.106	0.035	0.009	0.001	0.000	0.000	0.000	0.000	0.000
	2	1.000	0.994	0.962	0.797	0.679	0.552	0.315	0.145	0.050	0.011	0.004	0.001	0.000	0.000	0.000
	3	1.000	1.000	0.995	0.944	0.886	0.806	0.594	0.363	0.174	0.058	0.027	0.010	0.000	0.000	0.000
	4	1.000	1.000	1.000	0.990	0.973	0.942	0.826	0.637	0.406	0.194	0.114	0.056	0.005	0.000	0.000
	5	1.000	1.000	1.000	0.999	0.996	0.989	0.950	0.855	0.685	0.448	0.321	0.203	0.038	0.006	0.000
	6	1.000	1.000	1.000	1.000	1.000	0.999	0.991	0.965	0.894	0.745	0.633	0.497	0.187	0.057	0.003
	7	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.996	0.983	0.942	0.900	0.832	0.570	0.337	0.077
	8	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
$n = 9$	0	0.914	0.630	0.387	0.134	0.075	0.040	0.010	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	1	0.997	0.929	0.775	0.436	0.300	0.196	0.071	0.020	0.004	0.000	0.000	0.000	0.000	0.000	0.000
	2	1.000	0.992	0.947	0.738	0.601	0.463	0.232	0.090	0.025	0.004	0.001	0.000	0.000	0.000	0.000
	3	1.000	0.999	0.992	0.914	0.834	0.730	0.483	0.254	0.099	0.025	0.010	0.003	0.000	0.000	0.000
	4	1.000	1.000	0.999	0.980	0.951	0.901	0.733	0.500	0.267	0.099	0.049	0.020	0.001	0.000	0.000
	5	1.000	1.000	1.000	0.997	0.990	0.975	0.901	0.746	0.517	0.270	0.166	0.086	0.008	0.001	0.000
	6	1.000	1.000	1.000	1.000	0.999	0.996	0.975	0.910	0.768	0.537	0.399	0.262	0.053	0.008	0.000
	7	1.000	1.000	1.000	1.000	1.000	1.000	0.996	0.980	0.929	0.804	0.700	0.564	0.225	0.071	0.003
	8	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.998	0.990	0.960	0.925	0.866	0.613	0.370	0.086
	9	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Tabla 4B. Probabilidades acumuladas p de la distribución binomial ($n = 10, 11, 12, 13, 14$).

	x	0.01	0.05	0.1	0.2	0.25	0.3	0.4	0.5	0.6	0.7	0.75	0.8	0.9	0.95	0.99
$n=10$	0	0.904	0.599	0.349	0.107	0.056	0.028	0.006	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	1	0.996	0.914	0.736	0.376	0.244	0.149	0.046	0.011	0.002	0.000	0.000	0.000	0.000	0.000	0.000
	2	1.000	0.988	0.930	0.678	0.526	0.383	0.167	0.055	0.012	0.002	0.000	0.000	0.000	0.000	0.000
	3	1.000	0.999	0.987	0.879	0.776	0.650	0.382	0.172	0.055	0.011	0.004	0.001	0.000	0.000	0.000
	4	1.000	1.000	0.998	0.967	0.922	0.850	0.633	0.377	0.166	0.047	0.020	0.006	0.000	0.000	0.000
	5	1.000	1.000	1.000	0.994	0.980	0.953	0.834	0.623	0.367	0.150	0.078	0.033	0.002	0.000	0.000
	6	1.000	1.000	1.000	0.999	0.996	0.989	0.945	0.828	0.618	0.350	0.224	0.121	0.013	0.001	0.000
	7	1.000	1.000	1.000	1.000	1.000	0.998	0.988	0.945	0.833	0.617	0.474	0.322	0.070	0.012	0.000
	8	1.000	1.000	1.000	1.000	1.000	1.000	0.998	0.989	0.954	0.851	0.756	0.624	0.264	0.086	0.004
	9	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.994	0.972	0.944	0.893	0.651	0.401	0.096
	10	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
$n=11$	0	0.895	0.569	0.314	0.086	0.042	0.020	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	1	0.995	0.898	0.697	0.322	0.197	0.113	0.030	0.006	0.001	0.000	0.000	0.000	0.000	0.000	0.000
	2	1.000	0.985	0.910	0.617	0.455	0.313	0.119	0.033	0.006	0.001	0.000	0.000	0.000	0.000	0.000
	3	1.000	0.998	0.981	0.839	0.713	0.570	0.296	0.113	0.029	0.004	0.001	0.000	0.000	0.000	0.000
	4	1.000	1.000	0.997	0.950	0.885	0.790	0.533	0.274	0.099	0.022	0.008	0.002	0.000	0.000	0.000
	5	1.000	1.000	1.000	0.988	0.966	0.922	0.753	0.500	0.247	0.078	0.034	0.012	0.000	0.000	0.000
	6	1.000	1.000	1.000	0.998	0.992	0.978	0.901	0.726	0.467	0.210	0.115	0.050	0.003	0.000	0.000
	7	1.000	1.000	1.000	1.000	0.999	0.996	0.971	0.887	0.704	0.430	0.287	0.161	0.019	0.002	0.000
	8	1.000	1.000	1.000	1.000	1.000	0.999	0.994	0.967	0.881	0.687	0.545	0.383	0.090	0.015	0.000
	9	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.994	0.970	0.887	0.803	0.678	0.303	0.102	0.005
	10	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.996	0.980	0.958	0.914	0.686	0.431	0.105
	11	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
$n=12$	0	0.886	0.540	0.282	0.069	0.032	0.014	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	1	0.994	0.882	0.659	0.275	0.158	0.085	0.020	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	2	1.000	0.980	0.889	0.558	0.391	0.253	0.083	0.019	0.003	0.000	0.000	0.000	0.000	0.000	0.000
	3	1.000	0.998	0.974	0.795	0.649	0.493	0.225	0.073	0.015	0.002	0.000	0.000	0.000	0.000	0.000
	4	1.000	1.000	0.996	0.927	0.842	0.724	0.438	0.194	0.057	0.009	0.003	0.001	0.000	0.000	0.000
	5	1.000	1.000	0.999	0.981	0.946	0.882	0.665	0.387	0.158	0.039	0.014	0.004	0.000	0.000	0.000
	6	1.000	1.000	1.000	0.996	0.986	0.961	0.842	0.613	0.335	0.118	0.054	0.019	0.001	0.000	0.000
	7	1.000	1.000	1.000	0.999	0.997	0.991	0.943	0.806	0.562	0.276	0.158	0.073	0.004	0.000	0.000
	8	1.000	1.000	1.000	1.000	1.000	0.998	0.985	0.927	0.775	0.507	0.351	0.205	0.026	0.002	0.000
	9	1.000	1.000	1.000	1.000	1.000	1.000	0.997	0.981	0.917	0.747	0.609	0.442	0.111	0.020	0.000
	10	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.997	0.980	0.915	0.842	0.725	0.341	0.118	0.006
	11	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.998	0.986	0.968	0.931	0.718	0.460	0.114
	12	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
$n=13$	0	0.878	0.513	0.254	0.055	0.024	0.010	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	1	0.993	0.865	0.621	0.234	0.127	0.064	0.013	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	2	1.000	0.975	0.866	0.502	0.333	0.202	0.058	0.011	0.001	0.000	0.000	0.000	0.000	0.000	0.000
	3	1.000	0.997	0.966	0.747	0.584	0.421	0.169	0.046	0.008	0.001	0.000	0.000	0.000	0.000	0.000
	4	1.000	1.000	0.994	0.901	0.794	0.654	0.353	0.133	0.032	0.004	0.001	0.000	0.000	0.000	0.000
	5	1.000	1.000	0.999	0.970	0.920	0.835	0.574	0.291	0.098	0.018	0.006	0.001	0.000	0.000	0.000
	6	1.000	1.000	1.000	0.993	0.976	0.938	0.771	0.500	0.229	0.062	0.024	0.007	0.000	0.000	0.000
	7	1.000	1.000	1.000	0.999	0.994	0.982	0.902	0.709	0.426	0.165	0.080	0.030	0.001	0.000	0.000
	8	1.000	1.000	1.000	1.000	0.999	0.996	0.968	0.867	0.647	0.346	0.206	0.099	0.006	0.000	0.000
	9	1.000	1.000	1.000	1.000	1.000	0.999	0.992	0.954	0.831	0.579	0.416	0.253	0.034	0.003	0.000
	10	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.989	0.942	0.798	0.667	0.498	0.134	0.025	0.000
	11	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.998	0.987	0.936	0.873	0.766	0.379	0.135	0.007
	12	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.990	0.976	0.945	0.746	0.487	0.122
	13	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
$n=14$	0	0.869	0.488	0.229	0.044	0.018	0.007	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	1	0.992	0.847	0.585	0.198	0.101	0.047	0.008	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	2	1.000	0.970	0.842	0.448	0.281	0.161	0.040	0.006	0.001	0.000	0.000	0.000	0.000	0.000	0.000
	3	1.000	0.996	0.956	0.698	0.521	0.355	0.124	0.029	0.004	0.000	0.000	0.000	0.000	0.000	0.000
	4	1.000	1.000	0.991	0.870	0.742	0.584	0.279	0.090	0.018	0.002	0.000	0.000	0.000	0.000	0.000
	5	1.000	1.000	0.999	0.956	0.888	0.781	0.486	0.212	0.058	0.008	0.002	0.000	0.000	0.000	0.000
	6	1.000	1.000	1.000	0.988	0.962	0.907	0.692	0.395	0.150	0.031	0.010	0.002	0.000	0.000	0.000
	7	1.000	1.000	1.000	0.998	0.990	0.969	0.850	0.605	0.308	0.093	0.038	0.012	0.000	0.000	0.000
	8	1.000	1.000	1.000	1.000	0.998	0.992	0.942	0.788	0.514	0.219	0.112	0.044	0.001	0.000	0.000
	9	1.000	1.000	1.000	1.000	1.000	0.998	0.982	0.910	0.721	0.416	0.258	0.130	0.009	0.000	0.000
	10	1.000	1.000	1.000	1.000	1.000	1.000	0.996	0.971	0.876	0.645	0.479	0.302	0.044	0.004	0.000
	11	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.994	0.960	0.839	0.719	0.552	0.158	0.030	0.000
	12	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.992	0.953	0.899	0.802	0.415	0.153	0.008
	13	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.993	0.982	0.956	0.771	0.512	0.131
	14	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Tabla 4C. Probabilidades acumuladas p de la distribución binomial ($n = 15, 16, 17, 18$).

	x	0.01	0.05	0.1	0.2	0.25	0.3	0.4	0.5	0.6	0.7	0.75	0.8	0.9	0.95	0.99
$n=15$	0	0.860	0.463	0.206	0.035	0.013	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	1	0.990	0.829	0.549	0.167	0.080	0.035	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	2	1.000	0.964	0.816	0.398	0.236	0.127	0.027	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	3	1.000	0.995	0.944	0.648	0.461	0.297	0.091	0.018	0.002	0.000	0.000	0.000	0.000	0.000	0.000
	4	1.000	0.999	0.987	0.836	0.686	0.515	0.217	0.059	0.009	0.001	0.000	0.000	0.000	0.000	0.000
	5	1.000	1.000	0.998	0.939	0.852	0.722	0.403	0.151	0.034	0.004	0.001	0.000	0.000	0.000	0.000
	6	1.000	1.000	1.000	0.982	0.943	0.869	0.610	0.304	0.095	0.015	0.004	0.001	0.000	0.000	0.000
	7	1.000	1.000	1.000	0.996	0.983	0.950	0.787	0.500	0.213	0.050	0.017	0.004	0.000	0.000	0.000
	8	1.000	1.000	1.000	0.999	0.996	0.985	0.905	0.696	0.390	0.131	0.057	0.018	0.000	0.000	0.000
	9	1.000	1.000	1.000	1.000	0.999	0.996	0.966	0.849	0.597	0.278	0.148	0.061	0.002	0.000	0.000
	10	1.000	1.000	1.000	1.000	1.000	0.999	0.991	0.941	0.783	0.485	0.314	0.164	0.013	0.001	0.000
	11	1.000	1.000	1.000	1.000	1.000	1.000	0.998	0.982	0.909	0.703	0.539	0.352	0.056	0.005	0.000
	12	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.996	0.973	0.873	0.764	0.602	0.184	0.036	0.000
	13	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.995	0.965	0.920	0.833	0.451	0.171	0.010
	14	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.995	0.987	0.965	0.794	0.537	0.140
	15	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
$n=16$	0	0.851	0.440	0.185	0.028	0.010	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	1	0.989	0.811	0.515	0.141	0.063	0.026	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	2	0.999	0.957	0.789	0.352	0.197	0.099	0.018	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	3	1.000	0.993	0.932	0.598	0.405	0.246	0.065	0.011	0.001	0.000	0.000	0.000	0.000	0.000	0.000
	4	1.000	0.999	0.983	0.798	0.630	0.450	0.167	0.038	0.005	0.000	0.000	0.000	0.000	0.000	0.000
	5	1.000	1.000	0.997	0.918	0.810	0.660	0.329	0.105	0.019	0.002	0.000	0.000	0.000	0.000	0.000
	6	1.000	1.000	0.999	0.973	0.920	0.825	0.527	0.227	0.058	0.007	0.002	0.000	0.000	0.000	0.000
	7	1.000	1.000	1.000	0.993	0.973	0.926	0.716	0.402	0.142	0.026	0.007	0.001	0.000	0.000	0.000
	8	1.000	1.000	1.000	0.999	0.993	0.974	0.858	0.598	0.284	0.074	0.027	0.007	0.000	0.000	0.000
	9	1.000	1.000	1.000	1.000	0.998	0.993	0.942	0.773	0.473	0.175	0.080	0.027	0.001	0.000	0.000
	10	1.000	1.000	1.000	1.000	1.000	0.998	0.981	0.895	0.671	0.340	0.190	0.082	0.003	0.000	0.000
	11	1.000	1.000	1.000	1.000	1.000	1.000	0.995	0.962	0.833	0.550	0.370	0.202	0.017	0.001	0.000
	12	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.989	0.935	0.754	0.595	0.402	0.068	0.007	0.000
	13	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.998	0.982	0.901	0.803	0.648	0.211	0.043	0.001
	14	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.997	0.974	0.937	0.859	0.485	0.189	0.011
	15	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.997	0.990	0.972	0.815	0.560	0.149
	16	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
$n=17$	0	0.843	0.418	0.167	0.023	0.008	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	1	0.988	0.792	0.482	0.118	0.050	0.019	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	2	0.999	0.950	0.762	0.310	0.164	0.077	0.012	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	3	1.000	0.991	0.917	0.549	0.353	0.202	0.046	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	4	1.000	0.999	0.978	0.758	0.574	0.389	0.126	0.025	0.003	0.000	0.000	0.000	0.000	0.000	0.000
	5	1.000	1.000	0.995	0.894	0.765	0.597	0.264	0.072	0.011	0.001	0.000	0.000	0.000	0.000	0.000
	6	1.000	1.000	0.999	0.962	0.893	0.775	0.448	0.166	0.035	0.003	0.001	0.000	0.000	0.000	0.000
	7	1.000	1.000	1.000	0.989	0.960	0.895	0.641	0.315	0.092	0.013	0.003	0.000	0.000	0.000	0.000
	8	1.000	1.000	1.000	0.997	0.988	0.960	0.801	0.500	0.199	0.040	0.012	0.003	0.000	0.000	0.000
	9	1.000	1.000	1.000	1.000	0.997	0.987	0.908	0.685	0.359	0.105	0.040	0.011	0.000	0.000	0.000
	10	1.000	1.000	1.000	1.000	0.999	0.997	0.965	0.834	0.552	0.225	0.107	0.038	0.001	0.000	0.000
	11	1.000	1.000	1.000	1.000	1.000	0.999	0.989	0.928	0.736	0.403	0.235	0.106	0.005	0.000	0.000
	12	1.000	1.000	1.000	1.000	1.000	1.000	0.997	0.975	0.874	0.611	0.426	0.242	0.022	0.001	0.000
	13	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.994	0.954	0.798	0.647	0.451	0.083	0.009	0.000
	14	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.988	0.923	0.836	0.690	0.238	0.050	0.001
	15	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.998	0.981	0.950	0.882	0.518	0.208	0.012
	16	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.998	0.992	0.977	0.833	0.582	0.157
	17	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
$n=18$	0	0.835	0.397	0.150	0.018	0.006	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	1	0.986	0.774	0.450	0.099	0.039	0.014	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	2	0.999	0.942	0.734	0.271	0.135	0.060	0.008	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	3	1.000	0.989	0.902	0.501	0.306	0.165	0.033	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	4	1.000	0.998	0.972	0.716	0.519	0.333	0.094	0.015	0.001	0.000	0.000	0.000	0.000	0.000	0.000
	5	1.000	1.000	0.994	0.867	0.717	0.534	0.209	0.048	0.006	0.000	0.000	0.000	0.000	0.000	0.000
	6	1.000	1.000	0.999	0.949	0.861	0.722	0.374	0.119	0.020	0.001	0.000	0.000	0.000	0.000	0.000
	7	1.000	1.000	1.000	0.984	0.943	0.859	0.563	0.240	0.058	0.006	0.001	0.000	0.000	0.000	0.000
	8	1.000	1.000	1.000	0.996	0.981	0.940	0.737	0.407	0.135	0.021	0.005	0.001	0.000	0.000	0.000
	9	1.000	1.000	1.000	0.999	0.995	0.979	0.865	0.593	0.263	0.060	0.019	0.004	0.000	0.000	0.000
	10	1.000	1.000	1.000	1.000	0.999	0.994	0.942	0.760	0.437	0.141	0.057	0.016	0.000	0.000	0.000
	11	1.000	1.000	1.000	1.000	1.000	0.999	0.980	0.881	0.626	0.278	0.139	0.051	0.001	0.000	0.000
	12	1.000	1.000	1.000	1.000	1.000	1.000	0.994	0.952	0.791	0.466	0.283	0.133	0.006	0.000	0.000
	13	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.985	0.906	0.667	0.481	0.284	0.028	0.002	0.000
	14	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.996	0.967	0.835	0.694	0.499	0.098	0.011	0.000
	15	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.992	0.940	0.865	0.729	0.266	0.058	0.001
	16	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.986	0.961	0.901	0.550	0.226	0.014
	17	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.998	0.994	0.982	0.850	0.603	0.165
	18	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Tabla 4D. Probabilidades acumuladas p de la distribución binomial $(n = 19, 20, 21)$.

	x	0.01	0.05	0.1	0.2	0.25	0.3	0.4	0.5	0.6	0.7	0.75	0.8	0.9	0.95	0.99
$n = 19$	0	0.826	0.377	0.135	0.014	0.004	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	1	0.985	0.755	0.420	0.083	0.031	0.010	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	2	0.999	0.933	0.705	0.237	0.111	0.046	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	3	1.000	0.987	0.885	0.455	0.263	0.133	0.023	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	4	1.000	0.998	0.965	0.673	0.465	0.282	0.070	0.010	0.001	0.000	0.000	0.000	0.000	0.000	0.000
	5	1.000	1.000	0.991	0.837	0.668	0.474	0.163	0.032	0.003	0.000	0.000	0.000	0.000	0.000	0.000
	6	1.000	1.000	0.998	0.932	0.825	0.666	0.308	0.084	0.012	0.001	0.000	0.000	0.000	0.000	0.000
	7	1.000	1.000	1.000	0.977	0.923	0.818	0.488	0.180	0.035	0.003	0.000	0.000	0.000	0.000	0.000
	8	1.000	1.000	1.000	0.993	0.971	0.916	0.667	0.324	0.088	0.011	0.002	0.000	0.000	0.000	0.000
	9	1.000	1.000	1.000	0.998	0.991	0.967	0.814	0.500	0.186	0.033	0.009	0.002	0.000	0.000	0.000
	10	1.000	1.000	1.000	1.000	0.998	0.989	0.912	0.676	0.333	0.084	0.029	0.007	0.000	0.000	0.000
	11	1.000	1.000	1.000	1.000	1.000	0.997	0.965	0.820	0.512	0.182	0.077	0.023	0.000	0.000	0.000
	12	1.000	1.000	1.000	1.000	1.000	0.999	0.988	0.916	0.692	0.334	0.175	0.068	0.002	0.000	0.000
	13	1.000	1.000	1.000	1.000	1.000	1.000	0.997	0.968	0.837	0.526	0.332	0.163	0.009	0.000	0.000
	14	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.990	0.930	0.718	0.535	0.327	0.035	0.002	0.000
	15	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.998	0.977	0.867	0.737	0.545	0.115	0.013	0.000
	16	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.995	0.954	0.889	0.763	0.295	0.067	0.001
	17	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.990	0.969	0.917	0.580	0.245	0.015
	18	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.996	0.986	0.865	0.623	0.174
	19	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
$n = 20$	0	0.818	0.358	0.122	0.012	0.003	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	1	0.983	0.736	0.392	0.069	0.024	0.008	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	2	0.999	0.925	0.677	0.206	0.091	0.035	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	3	1.000	0.984	0.867	0.411	0.225	0.107	0.016	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	4	1.000	0.997	0.957	0.630	0.415	0.238	0.051	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	5	1.000	1.000	0.989	0.804	0.617	0.416	0.126	0.021	0.002	0.000	0.000	0.000	0.000	0.000	0.000
	6	1.000	1.000	0.998	0.913	0.786	0.608	0.250	0.058	0.006	0.000	0.000	0.000	0.000	0.000	0.000
	7	1.000	1.000	1.000	0.968	0.898	0.772	0.416	0.132	0.021	0.001	0.000	0.000	0.000	0.000	0.000
	8	1.000	1.000	1.000	0.990	0.959	0.887	0.596	0.252	0.057	0.005	0.001	0.000	0.000	0.000	0.000
	9	1.000	1.000	1.000	0.997	0.986	0.952	0.755	0.412	0.128	0.017	0.004	0.001	0.000	0.000	0.000
	10	1.000	1.000	1.000	0.999	0.996	0.983	0.872	0.588	0.245	0.048	0.014	0.003	0.000	0.000	0.000
	11	1.000	1.000	1.000	1.000	0.999	0.995	0.943	0.748	0.404	0.113	0.041	0.010	0.000	0.000	0.000
	12	1.000	1.000	1.000	1.000	1.000	0.999	0.979	0.868	0.584	0.228	0.102	0.032	0.000	0.000	0.000
	13	1.000	1.000	1.000	1.000	1.000	1.000	0.994	0.942	0.750	0.392	0.214	0.087	0.002	0.000	0.000
	14	1.000	1.000	1.000	1.000	1.000	1.000	0.998	0.979	0.874	0.584	0.383	0.196	0.011	0.000	0.000
	15	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.994	0.949	0.762	0.585	0.370	0.043	0.003	0.000
	16	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.984	0.893	0.775	0.589	0.133	0.016	0.000
	17	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.996	0.965	0.909	0.794	0.323	0.075	0.001
	18	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.992	0.976	0.931	0.608	0.264	0.017
	19	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.997	0.988	0.878	0.642	0.182
	20	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
$n = 21$	0	0.810	0.341	0.109	0.009	0.002	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	1	0.981	0.717	0.365	0.058	0.019	0.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	2	0.999	0.915	0.648	0.179	0.075	0.027	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	3	1.000	0.981	0.848	0.370	0.192	0.086	0.011	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	4	1.000	0.997	0.948	0.586	0.367	0.198	0.037	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	5	1.000	1.000	0.986	0.769	0.567	0.363	0.096	0.013	0.001	0.000	0.000	0.000	0.000	0.000	0.000
	6	1.000	1.000	0.997	0.891	0.744	0.551	0.200	0.039	0.004	0.000	0.000	0.000	0.000	0.000	0.000
	7	1.000	1.000	0.999	0.957	0.870	0.723	0.350	0.095	0.012	0.001	0.000	0.000	0.000	0.000	0.000
	8	1.000	1.000	1.000	0.986	0.944	0.852	0.524	0.192	0.035	0.002	0.000	0.000	0.000	0.000	0.000
	9	1.000	1.000	1.000	0.996	0.979	0.932	0.691	0.332	0.085	0.009	0.002	0.000	0.000	0.000	0.000
	10	1.000	1.000	1.000	0.999	0.994	0.974	0.826	0.500	0.174	0.026	0.006	0.001	0.000	0.000	0.000
	11	1.000	1.000	1.000	1.000	0.998	0.991	0.915	0.668	0.309	0.068	0.021	0.004	0.000	0.000	0.000
	12	1.000	1.000	1.000	1.000	1.000	0.998	0.965	0.808	0.476	0.148	0.056	0.014	0.000	0.000	0.000
	13	1.000	1.000	1.000	1.000	1.000	0.999	0.988	0.905	0.650	0.277	0.130	0.043	0.001	0.000	0.000
	14	1.000	1.000	1.000	1.000	1.000	1.000	0.996	0.961	0.800	0.449	0.256	0.109	0.003	0.000	0.000
	15	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.987	0.904	0.637	0.433	0.231	0.014	0.000	0.000
	16	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.996	0.963	0.802	0.633	0.414	0.052	0.003	0.000
	17	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.989	0.914	0.808	0.630	0.152	0.019	0.000
	18	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.998	0.973	0.925	0.821	0.352	0.085	0.001
	19	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.994	0.981	0.942	0.635	0.283	0.019
	20	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.998	0.991	0.891	0.659	0.190
	21	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Tabla 4E. Probabilidades acumuladas p de la distribución binomial ($n = 22, 23$).

	x	0.01	0.05	0.1	0.2	0.25	0.3	0.4	0.5	0.6	0.7	0.75	0.8	0.9	0.95	0.99
$n = 22$	0	0.802	0.324	0.098	0.007	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	1	0.980	0.698	0.339	0.048	0.015	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	2	0.999	0.905	0.620	0.154	0.061	0.021	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	3	1.000	0.978	0.828	0.332	0.162	0.068	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	4	1.000	0.996	0.938	0.543	0.323	0.165	0.027	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	5	1.000	0.999	0.982	0.733	0.517	0.313	0.072	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	6	1.000	1.000	0.996	0.867	0.699	0.494	0.158	0.026	0.002	0.000	0.000	0.000	0.000	0.000	0.000
	7	1.000	1.000	0.999	0.944	0.838	0.671	0.290	0.067	0.007	0.000	0.000	0.000	0.000	0.000	0.000
	8	1.000	1.000	1.000	0.980	0.925	0.814	0.454	0.143	0.021	0.001	0.000	0.000	0.000	0.000	0.000
	9	1.000	1.000	1.000	0.994	0.970	0.908	0.624	0.262	0.055	0.004	0.001	0.000	0.000	0.000	0.000
	10	1.000	1.000	1.000	0.998	0.990	0.961	0.772	0.416	0.121	0.014	0.003	0.000	0.000	0.000	0.000
	11	1.000	1.000	1.000	1.000	0.997	0.986	0.879	0.584	0.228	0.039	0.010	0.002	0.000	0.000	0.000
	12	1.000	1.000	1.000	1.000	0.999	0.996	0.945	0.738	0.376	0.092	0.030	0.006	0.000	0.000	0.000
	13	1.000	1.000	1.000	1.000	1.000	0.999	0.979	0.857	0.546	0.186	0.075	0.020	0.000	0.000	0.000
	14	1.000	1.000	1.000	1.000	1.000	1.000	0.993	0.933	0.710	0.329	0.162	0.056	0.001	0.000	0.000
	15	1.000	1.000	1.000	1.000	1.000	1.000	0.998	0.974	0.842	0.506	0.301	0.133	0.004	0.000	0.000
	16	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.992	0.928	0.687	0.483	0.267	0.018	0.001	0.000
	17	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.998	0.973	0.835	0.677	0.457	0.062	0.004	0.000
	18	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.992	0.932	0.838	0.668	0.172	0.022	0.000
	19	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.998	0.979	0.939	0.846	0.380	0.095	0.001
	20	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.996	0.985	0.952	0.661	0.302	0.020
	21	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.998	0.993	0.902	0.676	0.198
	22	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
$n = 23$	0	0.794	0.307	0.089	0.006	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	1	0.978	0.679	0.315	0.040	0.012	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	2	0.998	0.895	0.592	0.133	0.049	0.016	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	3	1.000	0.974	0.807	0.297	0.137	0.054	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	4	1.000	0.995	0.927	0.501	0.283	0.136	0.019	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	5	1.000	0.999	0.977	0.695	0.468	0.269	0.054	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	6	1.000	1.000	0.994	0.840	0.654	0.440	0.124	0.017	0.001	0.000	0.000	0.000	0.000	0.000	0.000
	7	1.000	1.000	0.999	0.928	0.804	0.618	0.237	0.047	0.004	0.000	0.000	0.000	0.000	0.000	0.000
	8	1.000	1.000	1.000	0.973	0.904	0.771	0.388	0.105	0.013	0.001	0.000	0.000	0.000	0.000	0.000
	9	1.000	1.000	1.000	0.991	0.959	0.880	0.556	0.202	0.035	0.002	0.000	0.000	0.000	0.000	0.000
	10	1.000	1.000	1.000	0.997	0.985	0.945	0.713	0.339	0.081	0.007	0.001	0.000	0.000	0.000	0.000
	11	1.000	1.000	1.000	0.999	0.995	0.979	0.836	0.500	0.164	0.021	0.005	0.001	0.000	0.000	0.000
	12	1.000	1.000	1.000	1.000	0.999	0.993	0.919	0.661	0.287	0.055	0.015	0.003	0.000	0.000	0.000
	13	1.000	1.000	1.000	1.000	1.000	0.998	0.965	0.798	0.444	0.120	0.041	0.009	0.000	0.000	0.000
	14	1.000	1.000	1.000	1.000	1.000	0.999	0.987	0.895	0.612	0.229	0.096	0.027	0.000	0.000	0.000
	15	1.000	1.000	1.000	1.000	1.000	1.000	0.996	0.953	0.763	0.382	0.196	0.072	0.001	0.000	0.000
	16	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.983	0.876	0.560	0.346	0.160	0.006	0.000	0.000
	17	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.995	0.946	0.731	0.532	0.305	0.023	0.001	0.000
	18	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.981	0.864	0.717	0.499	0.073	0.005	0.000
	19	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.995	0.946	0.863	0.703	0.193	0.026	0.000
	20	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.984	0.951	0.867	0.408	0.105	0.002
	21	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.997	0.988	0.960	0.685	0.321	0.022
	22	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.994	0.911	0.693	0.206
	23	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Tabla 4F. Probabilidades acumuladas p de la distribución binomial ($n = 24, 25$).

	x	0.01	0.05	0.1	0.2	0.25	0.3	0.4	0.5	0.6	0.7	0.75	0.8	0.9	0.95	0.99
$n=24$	0	0.786	0.292	0.080	0.005	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	1	0.976	0.661	0.292	0.033	0.009	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	2	0.998	0.884	0.564	0.115	0.040	0.012	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	3	1.000	0.970	0.786	0.264	0.115	0.042	0.004	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	4	1.000	0.994	0.915	0.460	0.247	0.111	0.013	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	5	1.000	0.999	0.972	0.656	0.422	0.229	0.040	0.003	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	6	1.000	1.000	0.993	0.811	0.607	0.389	0.096	0.011	0.001	0.000	0.000	0.000	0.000	0.000	0.000
	7	1.000	1.000	0.998	0.911	0.766	0.565	0.192	0.032	0.002	0.000	0.000	0.000	0.000	0.000	0.000
	8	1.000	1.000	1.000	0.964	0.879	0.725	0.328	0.076	0.008	0.000	0.000	0.000	0.000	0.000	0.000
	9	1.000	1.000	1.000	0.987	0.945	0.847	0.489	0.154	0.022	0.001	0.000	0.000	0.000	0.000	0.000
	10	1.000	1.000	1.000	0.996	0.979	0.926	0.650	0.271	0.053	0.004	0.001	0.000	0.000	0.000	0.000
	11	1.000	1.000	1.000	0.999	0.993	0.969	0.787	0.419	0.114	0.012	0.002	0.000	0.000	0.000	0.000
	12	1.000	1.000	1.000	1.000	0.998	0.988	0.886	0.581	0.213	0.031	0.007	0.001	0.000	0.000	0.000
	13	1.000	1.000	1.000	1.000	0.999	0.996	0.947	0.729	0.350	0.074	0.021	0.004	0.000	0.000	0.000
	14	1.000	1.000	1.000	1.000	1.000	0.999	0.978	0.846	0.511	0.153	0.055	0.013	0.000	0.000	0.000
	15	1.000	1.000	1.000	1.000	1.000	1.000	0.992	0.924	0.672	0.275	0.121	0.036	0.000	0.000	0.000
	16	1.000	1.000	1.000	1.000	1.000	1.000	0.998	0.968	0.808	0.435	0.234	0.089	0.002	0.000	0.000
	17	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.989	0.904	0.611	0.393	0.189	0.007	0.000	0.000
	18	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.997	0.960	0.771	0.578	0.344	0.028	0.001	0.000
	19	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.987	0.889	0.753	0.540	0.085	0.006	0.000
	20	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.996	0.958	0.885	0.736	0.214	0.030	0.000
	21	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.988	0.960	0.885	0.436	0.116	0.002
	22	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.998	0.991	0.967	0.708	0.339	0.024
	23	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.995	0.920	0.708	0.214
	24	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000
$n=25$	0	0.778	0.277	0.072	0.004	0.001	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	1	0.974	0.642	0.271	0.027	0.007	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	2	0.998	0.873	0.537	0.098	0.032	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	3	1.000	0.966	0.764	0.234	0.096	0.033	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	4	1.000	0.993	0.902	0.421	0.214	0.090	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	5	1.000	0.999	0.967	0.617	0.378	0.193	0.029	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	6	1.000	1.000	0.991	0.780	0.561	0.341	0.074	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	7	1.000	1.000	0.998	0.891	0.727	0.512	0.154	0.022	0.001	0.000	0.000	0.000	0.000	0.000	0.000
	8	1.000	1.000	1.000	0.953	0.851	0.677	0.274	0.054	0.004	0.000	0.000	0.000	0.000	0.000	0.000
	9	1.000	1.000	1.000	0.983	0.929	0.811	0.425	0.115	0.013	0.000	0.000	0.000	0.000	0.000	0.000
	10	1.000	1.000	1.000	0.994	0.970	0.902	0.586	0.212	0.034	0.002	0.000	0.000	0.000	0.000	0.000
	11	1.000	1.000	1.000	0.998	0.989	0.956	0.732	0.345	0.078	0.006	0.001	0.000	0.000	0.000	0.000
	12	1.000	1.000	1.000	1.000	0.997	0.983	0.846	0.500	0.154	0.017	0.003	0.000	0.000	0.000	0.000
	13	1.000	1.000	1.000	1.000	0.999	0.994	0.922	0.655	0.268	0.044	0.011	0.002	0.000	0.000	0.000
	14	1.000	1.000	1.000	1.000	1.000	0.998	0.966	0.788	0.414	0.098	0.030	0.006	0.000	0.000	0.000
	15	1.000	1.000	1.000	1.000	1.000	1.000	0.987	0.885	0.575	0.189	0.071	0.017	0.000	0.000	0.000
	16	1.000	1.000	1.000	1.000	1.000	1.000	0.996	0.946	0.726	0.323	0.149	0.047	0.000	0.000	0.000
	17	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.978	0.846	0.488	0.273	0.109	0.002	0.000	0.000
	18	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.993	0.926	0.659	0.439	0.220	0.009	0.000	0.000
	19	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.998	0.971	0.807	0.622	0.383	0.033	0.001	0.000
	20	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.991	0.910	0.786	0.579	0.098	0.007	0.000
	21	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.998	0.967	0.904	0.766	0.236	0.034	0.000
	22	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.991	0.968	0.902	0.463	0.127	0.002
	23	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.998	0.993	0.973	0.729	0.358	0.026
	24	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.996	0.928	0.723	0.222
	24	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

5. Distribución Poisson

$$X \sim \text{Poisson}(\lambda)$$

$$\text{p} = P(X \leq x) = \sum_{k=0}^{x} \frac{\lambda^k e^{-\lambda}}{k!} = 1 - \alpha$$
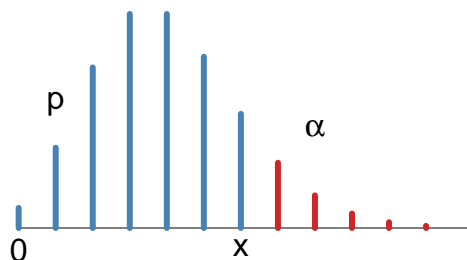
Tabla 5A. Probabilidades acumuladas p de la distribución Poisson.

x	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
0	0.905	0.819	0.741	0.670	0.607	0.549	0.497	0.449	0.407	0.368
1	0.995	0.982	0.963	0.938	0.910	0.878	0.844	0.809	0.772	0.736
2	1.000	0.999	0.996	0.992	0.986	0.977	0.966	0.953	0.937	0.920
3	1.000	1.000	1.000	0.999	0.998	0.997	0.994	0.991	0.987	0.981
4	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.999	0.998	0.996
5	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.999
6	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

The table columns are under the heading λ.

Tabla 5B. Probabilidades acumuladas p de la distribución Poisson.

x	2	3	4	5	6	7	8	9	10	15	20
0	0.135	0.050	0.018	0.007	0.002	0.001	0.000	0.000	0.000	0.000	0.000
1	0.406	0.199	0.092	0.040	0.017	0.007	0.003	0.001	0.000	0.000	0.000
2	0.677	0.423	0.238	0.125	0.062	0.030	0.014	0.006	0.003	0.000	0.000
3	0.857	0.647	0.433	0.265	0.151	0.082	0.042	0.021	0.010	0.000	0.000
4	0.947	0.815	0.629	0.440	0.285	0.173	0.100	0.055	0.029	0.001	0.000
5	0.983	0.916	0.785	0.616	0.446	0.301	0.191	0.116	0.067	0.003	0.000
6	0.995	0.966	0.889	0.762	0.606	0.450	0.313	0.207	0.130	0.008	0.000
7	0.999	0.988	0.949	0.867	0.744	0.599	0.453	0.324	0.220	0.018	0.001
8	1.000	0.996	0.979	0.932	0.847	0.729	0.593	0.456	0.333	0.037	0.002
9	1.000	0.999	0.992	0.968	0.916	0.830	0.717	0.587	0.458	0.070	0.005
10	1.000	1.000	0.997	0.986	0.957	0.901	0.816	0.706	0.583	0.118	0.011
11	1.000	1.000	0.999	0.995	0.980	0.947	0.888	0.803	0.697	0.185	0.021
12	1.000	1.000	1.000	0.998	0.991	0.973	0.936	0.876	0.792	0.268	0.039
13	1.000	1.000	1.000	0.999	0.996	0.987	0.966	0.926	0.864	0.363	0.066
14	1.000	1.000	1.000	1.000	0.999	0.994	0.983	0.959	0.917	0.466	0.105
15	1.000	1.000	1.000	1.000	0.999	0.998	0.992	0.978	0.951	0.568	0.157
16	1.000	1.000	1.000	1.000	1.000	0.999	0.996	0.989	0.973	0.664	0.221
17	1.000	1.000	1.000	1.000	1.000	1.000	0.998	0.995	0.986	0.749	0.297
18	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.998	0.993	0.819	0.381
19	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.997	0.875	0.470
20	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.998	0.917	0.559
21	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.947	0.644
22	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.967	0.721
23	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.981	0.787
24	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.989	0.843
25	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.994	0.888
26	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.997	0.922
27	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.998	0.948
28	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.999	0.966
29	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.978
30	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.987
31	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.992
32	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.995
33	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.997
34	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.999
35	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	0.999
36	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

The table columns are under the heading λ.

6. Distribución Normal Estándar

$Z \sim \text{Normal}(0,1)$

$$\text{p} = P(Z \leq z) = \Phi(z) = \int_{-\infty}^{z} \phi(u)du = 1 - \alpha$$

donde

$$\phi(u) = \frac{1}{\sqrt{2\pi}}\, e^{-\frac{1}{2}u^2}$$
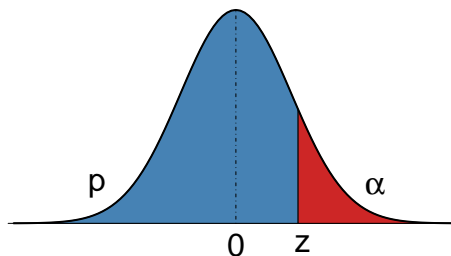
Nota: Si $X \sim \text{N}(\mu, \sigma^2)$, entonces $Z = (X - \mu)/\sigma \sim \text{N}(0,1)$. Luego,

$$P(X \leq x) = \Phi\left(\frac{x - \mu}{\sigma}\right)$$

Tabla 6A. Probabilidades acumuladas p de la distribución normal estándar.

z	0.09	0.08	0.07	0.06	0.05	0.04	0.03	0.02	0.01	0.00
−3.4	0.0002	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003	0.0003
−3.3	0.0003	0.0004	0.0004	0.0004	0.0004	0.0004	0.0004	0.0005	0.0005	0.0005
−3.2	0.0005	0.0005	0.0005	0.0006	0.0006	0.0006	0.0006	0.0006	0.0007	0.0007
−3.1	0.0007	0.0007	0.0008	0.0008	0.0008	0.0008	0.0009	0.0009	0.0009	0.0010
−3.0	0.0010	0.0010	0.0011	0.0011	0.0011	0.0012	0.0012	0.0013	0.0013	0.0013
−2.9	0.0014	0.0014	0.0015	0.0015	0.0016	0.0016	0.0017	0.0018	0.0018	0.0019
−2.8	0.0019	0.0020	0.0021	0.0021	0.0022	0.0023	0.0023	0.0024	0.0025	0.0026
−2.7	0.0026	0.0027	0.0028	0.0029	0.0030	0.0031	0.0032	0.0033	0.0034	0.0035
−2.6	0.0036	0.0037	0.0038	0.0039	0.0040	0.0041	0.0043	0.0044	0.0045	0.0047
−2.5	0.0048	0.0049	0.0051	0.0052	0.0054	0.0055	0.0057	0.0059	0.0060	0.0062
−2.4	0.0064	0.0066	0.0068	0.0069	0.0071	0.0073	0.0075	0.0078	0.0080	0.0082
−2.3	0.0084	0.0087	0.0089	0.0091	0.0094	0.0096	0.0099	0.0102	0.0104	0.0107
−2.2	0.0110	0.0113	0.0116	0.0119	0.0122	0.0125	0.0129	0.0132	0.0136	0.0139
−2.1	0.0143	0.0146	0.0150	0.0154	0.0158	0.0162	0.0166	0.0170	0.0174	0.0179
−2.0	0.0183	0.0188	0.0192	0.0197	0.0202	0.0207	0.0212	0.0217	0.0222	0.0228
−1.9	0.0233	0.0239	0.0244	0.0250	0.0256	0.0262	0.0268	0.0274	0.0281	0.0287
−1.8	0.0294	0.0301	0.0307	0.0314	0.0322	0.0329	0.0336	0.0344	0.0351	0.0359
−1.7	0.0367	0.0375	0.0384	0.0392	0.0401	0.0409	0.0418	0.0427	0.0436	0.0446
−1.6	0.0455	0.0465	0.0475	0.0485	0.0495	0.0505	0.0516	0.0526	0.0537	0.0548
−1.5	0.0559	0.0571	0.0582	0.0594	0.0606	0.0618	0.0630	0.0643	0.0655	0.0668
−1.4	0.0681	0.0694	0.0708	0.0721	0.0735	0.0749	0.0764	0.0778	0.0793	0.0808
−1.3	0.0823	0.0838	0.0853	0.0869	0.0885	0.0901	0.0918	0.0934	0.0951	0.0968
−1.2	0.0985	0.1003	0.1020	0.1038	0.1056	0.1075	0.1093	0.1112	0.1131	0.1151
−1.1	0.1170	0.1190	0.1210	0.1230	0.1251	0.1271	0.1292	0.1314	0.1335	0.1357
−1.0	0.1379	0.1401	0.1423	0.1446	0.1469	0.1492	0.1515	0.1539	0.1562	0.1587
−0.9	0.1611	0.1635	0.1660	0.1685	0.1711	0.1736	0.1762	0.1788	0.1814	0.1841
−0.8	0.1867	0.1894	0.1922	0.1949	0.1977	0.2005	0.2033	0.2061	0.2090	0.2119
−0.7	0.2148	0.2177	0.2206	0.2236	0.2266	0.2296	0.2327	0.2358	0.2389	0.2420
−0.6	0.2451	0.2483	0.2514	0.2546	0.2578	0.2611	0.2643	0.2676	0.2709	0.2743
−0.5	0.2776	0.2810	0.2843	0.2877	0.2912	0.2946	0.2981	0.3015	0.3050	0.3085
−0.4	0.3121	0.3156	0.3192	0.3228	0.3264	0.3300	0.3336	0.3372	0.3409	0.3446
−0.3	0.3483	0.3520	0.3557	0.3594	0.3632	0.3669	0.3707	0.3745	0.3783	0.3821
−0.2	0.3859	0.3897	0.3936	0.3974	0.4013	0.4052	0.4090	0.4129	0.4168	0.4207
−0.1	0.4247	0.4286	0.4325	0.4364	0.4404	0.4443	0.4483	0.4522	0.4562	0.4602
−0.0	0.4641	0.4681	0.4721	0.4761	0.4801	0.4840	0.4880	0.4920	0.4960	0.5000

Tabla 6B. Probabilidades acumuladas p de la distribución normal estándar.

z	0.00	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0.0	0.5000	0.5040	0.5080	0.5120	0.5160	0.5199	0.5239	0.5279	0.5319	0.5359
0.1	0.5398	0.5438	0.5478	0.5517	0.5557	0.5596	0.5636	0.5675	0.5714	0.5753
0.2	0.5793	0.5832	0.5871	0.5910	0.5948	0.5987	0.6026	0.6064	0.6103	0.6141
0.3	0.6179	0.6217	0.6255	0.6293	0.6331	0.6368	0.6406	0.6443	0.6480	0.6517
0.4	0.6554	0.6591	0.6628	0.6664	0.6700	0.6736	0.6772	0.6808	0.6844	0.6879
0.5	0.6915	0.6950	0.6985	0.7019	0.7054	0.7088	0.7123	0.7157	0.7190	0.7224
0.6	0.7257	0.7291	0.7324	0.7357	0.7389	0.7422	0.7454	0.7486	0.7517	0.7549
0.7	0.7580	0.7611	0.7642	0.7673	0.7704	0.7734	0.7764	0.7794	0.7823	0.7852
0.8	0.7881	0.7910	0.7939	0.7967	0.7995	0.8023	0.8051	0.8078	0.8106	0.8133
0.9	0.8159	0.8186	0.8212	0.8238	0.8264	0.8289	0.8315	0.8340	0.8365	0.8389
1.0	0.8413	0.8438	0.8461	0.8485	0.8508	0.8531	0.8554	0.8577	0.8599	0.8621
1.1	0.8643	0.8665	0.8686	0.8708	0.8729	0.8749	0.8770	0.8790	0.8810	0.8830
1.2	0.8849	0.8869	0.8888	0.8907	0.8925	0.8944	0.8962	0.8980	0.8997	0.9015
1.3	0.9032	0.9049	0.9066	0.9082	0.9099	0.9115	0.9131	0.9147	0.9162	0.9177
1.4	0.9192	0.9207	0.9222	0.9236	0.9251	0.9265	0.9279	0.9292	0.9306	0.9319
1.5	0.9332	0.9345	0.9357	0.9370	0.9382	0.9394	0.9406	0.9418	0.9429	0.9441
1.6	0.9452	0.9463	0.9474	0.9484	0.9495	0.9505	0.9515	0.9525	0.9535	0.9545
1.7	0.9554	0.9564	0.9573	0.9582	0.9591	0.9599	0.9608	0.9616	0.9625	0.9633
1.8	0.9641	0.9649	0.9656	0.9664	0.9671	0.9678	0.9686	0.9693	0.9699	0.9706
1.9	0.9713	0.9719	0.9726	0.9732	0.9738	0.9744	0.9750	0.9756	0.9761	0.9767
2.0	0.9772	0.9778	0.9783	0.9788	0.9793	0.9798	0.9803	0.9808	0.9812	0.9817
2.1	0.9821	0.9826	0.9830	0.9834	0.9838	0.9842	0.9846	0.9850	0.9854	0.9857
2.2	0.9861	0.9864	0.9868	0.9871	0.9875	0.9878	0.9881	0.9884	0.9887	0.9890
2.3	0.9893	0.9896	0.9898	0.9901	0.9904	0.9906	0.9909	0.9911	0.9913	0.9916
2.4	0.9918	0.9920	0.9922	0.9925	0.9927	0.9929	0.9931	0.9932	0.9934	0.9936
2.5	0.9938	0.9940	0.9941	0.9943	0.9945	0.9946	0.9948	0.9949	0.9951	0.9952
2.6	0.9953	0.9955	0.9956	0.9957	0.9959	0.9960	0.9961	0.9962	0.9963	0.9964
2.7	0.9965	0.9966	0.9967	0.9968	0.9969	0.9970	0.9971	0.9972	0.9973	0.9974
2.8	0.9974	0.9975	0.9976	0.9977	0.9977	0.9978	0.9979	0.9979	0.9980	0.9981
2.9	0.9981	0.9982	0.9982	0.9983	0.9984	0.9984	0.9985	0.9985	0.9986	0.9986
3.0	0.9987	0.9987	0.9987	0.9988	0.9988	0.9989	0.9989	0.9989	0.9990	0.9990
3.1	0.9990	0.9991	0.9991	0.9991	0.9992	0.9992	0.9992	0.9992	0.9993	0.9993
3.2	0.9993	0.9993	0.9994	0.9994	0.9994	0.9994	0.9994	0.9995	0.9995	0.9995
3.3	0.9995	0.9995	0.9995	0.9996	0.9996	0.9996	0.9996	0.9996	0.9996	0.9997
3.4	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9997	0.9998

7. Distribución χ^2 Ji-Cuadrada

$$Y \sim \chi^2_\nu$$

siendo ν los grados de libertad.

$$\mathrm{p} = P(Y \leq y) = \int_0^y f_Y(u)du = 1 - \alpha$$

donde, para $u \geq 0$,

$$f_Y(u) = \frac{1}{2^{\nu/2}\Gamma\left(\nu/2\right)}\, u^{\nu/2-1}e^{-u/2}$$
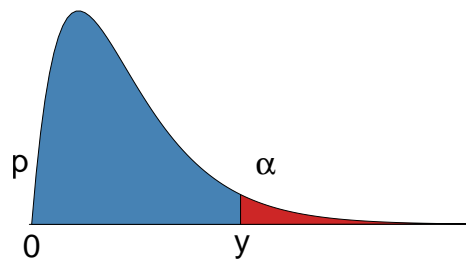
Tabla 7. Valores críticos $\chi^2_{(\alpha;\nu)}$ de la distribución χ^2_ν Ji-Cuadrada.

| | p | | | | | | | | | |
	0.005	0.01	0.025	0.05	0.1	0.90	0.95	0.975	0.99	0.995
						α				
ν	0.995	0.99	0.975	0.95	0.90	0.10	0.05	0.025	0.01	0.005
1	0.000	0.000	0.001	0.004	0.016	2.706	3.841	5.024	6.635	7.879
2	0.010	0.020	0.051	0.103	0.211	4.605	5.991	7.378	9.210	10.597
3	0.072	0.115	0.216	0.352	0.584	6.251	7.815	9.348	11.345	12.838
4	0.207	0.297	0.484	0.711	1.064	7.779	9.488	11.143	13.277	14.860
5	0.412	0.554	0.831	1.145	1.610	9.236	11.070	12.833	15.086	16.750
6	0.676	0.872	1.237	1.635	2.204	10.645	12.592	14.449	16.812	18.548
7	0.989	1.239	1.690	2.167	2.833	12.017	14.067	16.013	18.475	20.278
8	1.344	1.646	2.180	2.733	3.490	13.362	15.507	17.535	20.090	21.955
9	1.735	2.088	2.700	3.325	4.168	14.684	16.919	19.023	21.666	23.589
10	2.156	2.558	3.247	3.940	4.865	15.987	18.307	20.483	23.209	25.188
11	2.603	3.053	3.816	4.575	5.578	17.275	19.675	21.920	24.725	26.757
12	3.074	3.571	4.404	5.226	6.304	18.549	21.026	23.337	26.217	28.300
13	3.565	4.107	5.009	5.892	7.042	19.812	22.362	24.736	27.688	29.819
14	4.075	4.660	5.629	6.571	7.790	21.064	23.685	26.119	29.141	31.319
15	4.601	5.229	6.262	7.261	8.547	22.307	24.996	27.488	30.578	32.801
16	5.142	5.812	6.908	7.962	9.312	23.542	26.296	28.845	32.000	34.267
17	5.697	6.408	7.564	8.672	10.085	24.769	27.587	30.191	33.409	35.718
18	6.265	7.015	8.231	9.390	10.865	25.989	28.869	31.526	34.805	37.156
19	6.844	7.633	8.907	10.117	11.651	27.204	30.144	32.852	36.191	38.582
20	7.434	8.260	9.591	10.851	12.443	28.412	31.410	34.170	37.566	39.997
21	8.034	8.897	10.283	11.591	13.240	29.615	32.671	35.479	38.932	41.401
22	8.643	9.542	10.982	12.338	14.041	30.813	33.924	36.781	40.289	42.796
23	9.260	10.196	11.689	13.091	14.848	32.007	35.172	38.076	41.638	44.181
24	9.886	10.856	12.401	13.848	15.659	33.196	36.415	39.364	42.980	45.559
25	10.520	11.524	13.120	14.611	16.473	34.382	37.652	40.646	44.314	46.928
26	11.160	12.198	13.844	15.379	17.292	35.563	38.885	41.923	45.642	48.290
27	11.808	12.879	14.573	16.151	18.114	36.741	40.113	43.195	46.963	49.645
28	12.461	13.565	15.308	16.928	18.939	37.916	41.337	44.461	48.278	50.993
29	13.121	14.256	16.047	17.708	19.768	39.087	42.557	45.722	49.588	52.336
30	13.787	14.953	16.791	18.493	20.599	40.256	43.773	46.979	50.892	53.672
31	14.458	15.655	17.539	19.281	21.434	41.422	44.985	48.232	52.191	55.003
32	15.134	16.362	18.291	20.072	22.271	42.585	46.194	49.480	53.486	56.328
33	15.815	17.074	19.047	20.867	23.110	43.745	47.400	50.725	54.776	57.648
34	16.501	17.789	19.806	21.664	23.952	44.903	48.602	51.966	56.061	58.964
35	17.192	18.509	20.569	22.465	24.797	46.059	49.802	53.203	57.342	60.275
36	17.887	19.233	21.336	23.269	25.643	47.212	50.998	54.437	58.619	61.581
37	18.586	19.960	22.106	24.075	26.492	48.363	52.192	55.668	59.893	62.883
38	19.289	20.691	22.878	24.884	27.343	49.513	53.384	56.896	61.162	64.181
39	19.996	21.426	23.654	25.695	28.196	50.660	54.572	58.120	62.428	65.476
40	20.707	22.164	24.433	26.509	29.051	51.805	55.758	59.342	63.691	66.766
50	27.991	29.707	32.357	34.764	37.689	63.167	67.505	71.420	76.154	79.490
75	47.206	49.475	52.942	56.054	59.795	91.061	96.217	100.839	106.393	110.286
100	67.328	70.065	74.222	77.929	82.358	118.498	124.342	129.561	135.807	140.169

8. Distribución t de Student

$$T \sim t_\nu$$

siendo ν los grados de libertad.

$$\text{p} = P(T \leq t) = \int_{-\infty}^{t} f_T(u)du = 1 - \alpha$$

donde, para $-\infty < u < \infty$,

$$f_T(u) = \frac{1}{\sqrt{\nu\pi}} \frac{\Gamma\left(\frac{\nu+1}{2}\right)}{\Gamma\left(\frac{\nu}{2}\right)} \left(1 + \frac{u^2}{\nu}\right)^{-\frac{\nu+1}{2}}$$
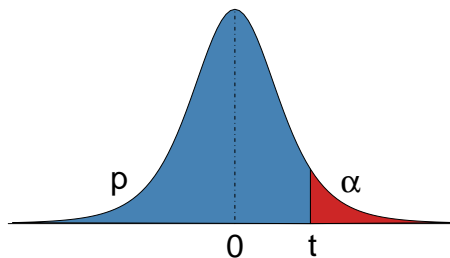
Tabla 8. Valores críticos $t_{(\alpha;\nu)}$ de la distribución t de Student.

	p									
	0.75	0.80	0.90	0.95	0.975	0.99	0.995	0.999	0.9995	0.9999
						α				
ν	0.25	0.20	0.10	0.05	0.025	0.01	0.005	0.001	0.0005	0.0001
1	1.000	1.376	3.078	6.314	12.706	31.821	63.657	318.309	636.619	3183.099
2	0.816	1.061	1.886	2.920	4.303	6.965	9.925	22.327	31.599	70.700
3	0.765	0.978	1.638	2.353	3.182	4.541	5.841	10.215	12.924	22.204
4	0.741	0.941	1.533	2.132	2.776	3.747	4.604	7.173	8.610	13.034
5	0.727	0.920	1.476	2.015	2.571	3.365	4.032	5.893	6.869	9.678
6	0.718	0.906	1.440	1.943	2.447	3.143	3.707	5.208	5.959	8.025
7	0.711	0.896	1.415	1.895	2.365	2.998	3.499	4.785	5.408	7.063
8	0.706	0.889	1.397	1.860	2.306	2.896	3.355	4.501	5.041	6.442
9	0.703	0.883	1.383	1.833	2.262	2.821	3.250	4.297	4.781	6.010
10	0.700	0.879	1.372	1.812	2.228	2.764	3.169	4.144	4.587	5.694
11	0.697	0.876	1.363	1.796	2.201	2.718	3.106	4.025	4.437	5.453
12	0.695	0.873	1.356	1.782	2.179	2.681	3.055	3.930	4.318	5.263
13	0.694	0.870	1.350	1.771	2.160	2.650	3.012	3.852	4.221	5.111
14	0.692	0.868	1.345	1.761	2.145	2.624	2.977	3.787	4.140	4.985
15	0.691	0.866	1.341	1.753	2.131	2.602	2.947	3.733	4.073	4.880
16	0.690	0.865	1.337	1.746	2.120	2.583	2.921	3.686	4.015	4.791
17	0.689	0.863	1.333	1.740	2.110	2.567	2.898	3.646	3.965	4.714
18	0.688	0.862	1.330	1.734	2.101	2.552	2.878	3.610	3.922	4.648
19	0.688	0.861	1.328	1.729	2.093	2.539	2.861	3.579	3.883	4.590
20	0.687	0.860	1.325	1.725	2.086	2.528	2.845	3.552	3.850	4.539
21	0.686	0.859	1.323	1.721	2.080	2.518	2.831	3.527	3.819	4.493
22	0.686	0.858	1.321	1.717	2.074	2.508	2.819	3.505	3.792	4.452
23	0.685	0.858	1.319	1.714	2.069	2.500	2.807	3.485	3.768	4.415
24	0.685	0.857	1.318	1.711	2.064	2.492	2.797	3.467	3.745	4.382
25	0.684	0.856	1.316	1.708	2.060	2.485	2.787	3.450	3.725	4.352
26	0.684	0.856	1.315	1.706	2.056	2.479	2.779	3.435	3.707	4.324
27	0.684	0.855	1.314	1.703	2.052	2.473	2.771	3.421	3.690	4.299
28	0.683	0.855	1.313	1.701	2.048	2.467	2.763	3.408	3.674	4.275
29	0.683	0.854	1.311	1.699	2.045	2.462	2.756	3.396	3.659	4.254
30	0.683	0.854	1.310	1.697	2.042	2.457	2.750	3.385	3.646	4.234
40	0.681	0.851	1.303	1.684	2.021	2.423	2.704	3.307	3.551	4.094
50	0.679	0.849	1.299	1.676	2.009	2.403	2.678	3.261	3.496	4.014
75	0.678	0.846	1.293	1.665	1.992	2.377	2.643	3.202	3.425	3.911
100	0.677	0.845	1.290	1.660	1.984	2.364	2.626	3.174	3.390	3.862
125	0.676	0.845	1.288	1.657	1.979	2.357	2.616	3.157	3.370	3.832
∞	0.674	0.842	1.282	1.645	1.960	2.326	2.576	3.090	3.291	3.719

9.   Distribución F

$$X \sim F_{\nu_1, \nu_2}$$

con ν_1 y ν_2 los grados de libertad (del numerador y denominador, respectivamente).

$$\mathrm{p} = P(X \leq x) = \int_0^x f_X(u)du = 1 - \alpha$$

donde, para $u > 0$,

$$f_X(u) = \frac{\Gamma\big((\nu_1 + \nu_2)/2\big)}{\Gamma(\nu_1/2)\Gamma(\nu_2/2)} \left(\frac{\nu_1}{\nu_2}\right)^{\nu_1/2} \frac{u^{\nu_1/2 - 1}}{[1 + (\nu_1/\nu_2)u]^{(\nu_1 + \nu_2)/2}}$$
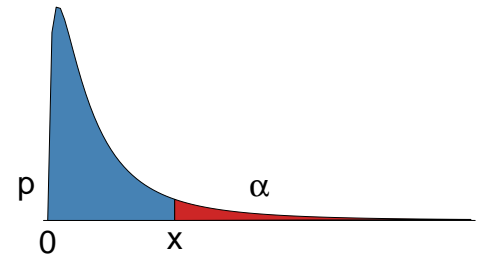
Nota: Si $X \sim F_{\nu_1, \nu_2}$, entonces,

$$\mathrm{p} = P(X \leq F_{(1-\alpha;\,\nu_1,\nu_2)}) = P\left(X \leq \frac{1}{F_{(\alpha;\,\nu_2,\nu_1)}}\right) = 1 - \alpha$$

Tabla 9A. Valores críticos $F_{(\alpha;\nu_1,\nu_2)}$ de la distribución F.

p = 0.90   α = 0.10

ν_2	ν_1 1	2	3	4	5	6	7	8	9	10	12	15	20	25	50	75	100	∞
1	39.86	49.50	53.59	55.83	57.24	58.20	58.91	59.44	59.86	60.19	60.71	61.22	61.74	62.05	62.69	62.90	63.01	63.32
2	8.53	9.00	9.16	9.24	9.29	9.33	9.35	9.37	9.38	9.39	9.41	9.42	9.44	9.45	9.47	9.48	9.48	9.49
3	5.54	5.46	5.39	5.34	5.31	5.28	5.27	5.25	5.24	5.23	5.22	5.20	5.18	5.17	5.15	5.15	5.14	5.13
4	4.54	4.32	4.19	4.11	4.05	4.01	3.98	3.95	3.94	3.92	3.90	3.87	3.84	3.83	3.80	3.78	3.78	3.76
5	4.06	3.78	3.62	3.52	3.45	3.40	3.37	3.34	3.32	3.30	3.27	3.24	3.21	3.19	3.15	3.13	3.13	3.11
6	3.78	3.46	3.29	3.18	3.11	3.05	3.01	2.98	2.96	2.94	2.90	2.87	2.84	2.81	2.77	2.75	2.75	2.72
7	3.59	3.26	3.07	2.96	2.88	2.83	2.78	2.75	2.72	2.70	2.67	2.63	2.59	2.57	2.52	2.51	2.50	2.47
8	3.46	3.11	2.92	2.81	2.73	2.67	2.62	2.59	2.56	2.54	2.50	2.46	2.42	2.40	2.35	2.33	2.32	2.29
9	3.36	3.01	2.81	2.69	2.61	2.55	2.51	2.47	2.44	2.42	2.38	2.34	2.30	2.27	2.22	2.20	2.19	2.16
10	3.29	2.92	2.73	2.61	2.52	2.46	2.41	2.38	2.35	2.32	2.28	2.24	2.20	2.17	2.12	2.10	2.09	2.06
11	3.23	2.86	2.66	2.54	2.45	2.39	2.34	2.30	2.27	2.25	2.21	2.17	2.12	2.10	2.04	2.02	2.01	1.97
12	3.18	2.81	2.61	2.48	2.39	2.33	2.28	2.24	2.21	2.19	2.15	2.10	2.06	2.03	1.97	1.95	1.94	1.90
13	3.14	2.76	2.56	2.43	2.35	2.28	2.23	2.20	2.16	2.14	2.10	2.05	2.01	1.98	1.92	1.89	1.88	1.85
14	3.10	2.73	2.52	2.39	2.31	2.24	2.19	2.15	2.12	2.10	2.05	2.01	1.96	1.93	1.87	1.85	1.83	1.80
15	3.07	2.70	2.49	2.36	2.27	2.21	2.16	2.12	2.09	2.06	2.02	1.97	1.92	1.89	1.83	1.80	1.79	1.76
16	3.05	2.67	2.46	2.33	2.24	2.18	2.13	2.09	2.06	2.03	1.99	1.94	1.89	1.86	1.79	1.77	1.76	1.72
17	3.03	2.64	2.44	2.31	2.22	2.15	2.10	2.06	2.03	2.00	1.96	1.91	1.86	1.83	1.76	1.74	1.73	1.69
18	3.01	2.62	2.42	2.29	2.20	2.13	2.08	2.04	2.00	1.98	1.93	1.89	1.84	1.80	1.74	1.71	1.70	1.66
19	2.99	2.61	2.40	2.27	2.18	2.11	2.06	2.02	1.98	1.96	1.91	1.86	1.81	1.78	1.71	1.69	1.67	1.63
20	2.97	2.59	2.38	2.25	2.16	2.09	2.04	2.00	1.96	1.94	1.89	1.84	1.79	1.76	1.69	1.66	1.65	1.61
21	2.96	2.57	2.36	2.23	2.14	2.08	2.02	1.98	1.95	1.92	1.87	1.83	1.78	1.74	1.67	1.64	1.63	1.59
22	2.95	2.56	2.35	2.22	2.13	2.06	2.01	1.97	1.93	1.90	1.86	1.81	1.76	1.73	1.65	1.63	1.61	1.57
23	2.94	2.55	2.34	2.21	2.11	2.05	1.99	1.95	1.92	1.89	1.84	1.80	1.74	1.71	1.64	1.61	1.59	1.55
24	2.93	2.54	2.33	2.19	2.10	2.04	1.98	1.94	1.91	1.88	1.83	1.78	1.73	1.70	1.62	1.59	1.58	1.53
25	2.92	2.53	2.32	2.18	2.09	2.02	1.97	1.93	1.89	1.87	1.82	1.77	1.72	1.68	1.61	1.58	1.56	1.52
26	2.91	2.52	2.31	2.17	2.08	2.01	1.96	1.92	1.88	1.86	1.81	1.76	1.71	1.67	1.59	1.57	1.55	1.50
27	2.90	2.51	2.30	2.17	2.07	2.00	1.95	1.91	1.87	1.85	1.80	1.75	1.70	1.66	1.58	1.55	1.54	1.49
28	2.89	2.50	2.29	2.16	2.06	2.00	1.94	1.90	1.87	1.84	1.79	1.74	1.69	1.65	1.57	1.54	1.53	1.48
29	2.89	2.50	2.28	2.15	2.06	1.99	1.93	1.89	1.86	1.83	1.78	1.73	1.68	1.64	1.56	1.53	1.52	1.47
30	2.88	2.49	2.28	2.14	2.05	1.98	1.93	1.88	1.85	1.82	1.77	1.72	1.67	1.63	1.55	1.52	1.51	1.46
40	2.84	2.44	2.23	2.09	2.00	1.93	1.87	1.83	1.79	1.76	1.71	1.66	1.61	1.57	1.48	1.45	1.43	1.38
60	2.79	2.39	2.18	2.04	1.95	1.87	1.82	1.77	1.74	1.71	1.66	1.60	1.54	1.50	1.41	1.38	1.36	1.29
80	2.77	2.37	2.15	2.02	1.92	1.85	1.79	1.75	1.71	1.68	1.63	1.57	1.51	1.47	1.38	1.34	1.32	1.25
100	2.76	2.36	2.14	2.00	1.91	1.83	1.78	1.73	1.69	1.66	1.61	1.56	1.49	1.45	1.35	1.32	1.29	1.22
120	2.75	2.35	2.13	1.99	1.90	1.82	1.77	1.72	1.68	1.65	1.60	1.55	1.48	1.44	1.34	1.30	1.28	1.19
∞	2.71	2.30	2.08	1.95	1.85	1.77	1.72	1.67	1.63	1.60	1.55	1.49	1.42	1.38	1.26	1.22	1.19	1.03

Tabla 9B. Valores críticos $F_{(\alpha;\nu_1,\nu_2)}$ de la distribución F.

p = 0.95 $\alpha = 0.05$

ν_2 \\ ν_1	1	2	3	4	5	6	7	8	9	10	12	15	20	25	50	75	100	∞
1	161.45	199.50	215.71	224.58	230.16	233.99	236.77	238.88	240.54	241.88	243.91	245.95	248.01	249.26	251.77	252.62	253.04	254.30
2	18.51	19.00	19.16	19.25	19.30	19.33	19.35	19.37	19.38	19.40	19.41	19.43	19.45	19.46	19.48	19.48	19.49	19.50
3	10.13	9.55	9.28	9.12	9.01	8.94	8.89	8.85	8.81	8.79	8.74	8.70	8.66	8.63	8.58	8.56	8.55	8.53
4	7.71	6.94	6.59	6.39	6.26	6.16	6.09	6.04	6.00	5.96	5.91	5.86	5.80	5.77	5.70	5.68	5.66	5.63
5	6.61	5.79	5.41	5.19	5.05	4.95	4.88	4.82	4.77	4.74	4.68	4.62	4.56	4.52	4.44	4.42	4.41	4.37
6	5.99	5.14	4.76	4.53	4.39	4.28	4.21	4.15	4.10	4.06	4.00	3.94	3.87	3.83	3.75	3.73	3.71	3.67
7	5.59	4.74	4.35	4.12	3.97	3.87	3.79	3.73	3.68	3.64	3.57	3.51	3.44	3.40	3.32	3.29	3.27	3.23
8	5.32	4.46	4.07	3.84	3.69	3.58	3.50	3.44	3.39	3.35	3.28	3.22	3.15	3.11	3.02	2.99	2.97	2.93
9	5.12	4.26	3.86	3.63	3.48	3.37	3.29	3.23	3.18	3.14	3.07	3.01	2.94	2.89	2.80	2.77	2.76	2.71
10	4.96	4.10	3.71	3.48	3.33	3.22	3.14	3.07	3.02	2.98	2.91	2.85	2.77	2.73	2.64	2.60	2.59	2.54
11	4.84	3.98	3.59	3.36	3.20	3.09	3.01	2.95	2.90	2.85	2.79	2.72	2.65	2.60	2.51	2.47	2.46	2.41
12	4.75	3.89	3.49	3.26	3.11	3.00	2.91	2.85	2.80	2.75	2.69	2.62	2.54	2.50	2.40	2.37	2.35	2.30
13	4.67	3.81	3.41	3.18	3.03	2.92	2.83	2.77	2.71	2.67	2.60	2.53	2.46	2.41	2.31	2.28	2.26	2.21
14	4.60	3.74	3.34	3.11	2.96	2.85	2.76	2.70	2.65	2.60	2.53	2.46	2.39	2.34	2.24	2.21	2.19	2.13
15	4.54	3.68	3.29	3.06	2.90	2.79	2.71	2.64	2.59	2.54	2.48	2.40	2.33	2.28	2.18	2.14	2.12	2.07
16	4.49	3.63	3.24	3.01	2.85	2.74	2.66	2.59	2.54	2.49	2.42	2.35	2.28	2.23	2.12	2.09	2.07	2.01
17	4.45	3.59	3.20	2.96	2.81	2.70	2.61	2.55	2.49	2.45	2.38	2.31	2.23	2.18	2.08	2.04	2.02	1.96
18	4.41	3.55	3.16	2.93	2.77	2.66	2.58	2.51	2.46	2.41	2.34	2.27	2.19	2.14	2.04	2.00	1.98	1.92
19	4.38	3.52	3.13	2.90	2.74	2.63	2.54	2.48	2.42	2.38	2.31	2.23	2.16	2.11	2.00	1.96	1.94	1.88
20	4.35	3.49	3.10	2.87	2.71	2.60	2.51	2.45	2.39	2.35	2.28	2.20	2.12	2.07	1.97	1.93	1.91	1.84
21	4.32	3.47	3.07	2.84	2.68	2.57	2.49	2.42	2.37	2.32	2.25	2.18	2.10	2.05	1.94	1.90	1.88	1.81
22	4.30	3.44	3.05	2.82	2.66	2.55	2.46	2.40	2.34	2.30	2.23	2.15	2.07	2.02	1.91	1.87	1.85	1.78
23	4.28	3.42	3.03	2.80	2.64	2.53	2.44	2.37	2.32	2.27	2.20	2.13	2.05	2.00	1.88	1.84	1.82	1.76
24	4.26	3.40	3.01	2.78	2.62	2.51	2.42	2.36	2.30	2.25	2.18	2.11	2.03	1.97	1.86	1.82	1.80	1.73
25	4.24	3.39	2.99	2.76	2.60	2.49	2.40	2.34	2.28	2.24	2.16	2.09	2.01	1.96	1.84	1.80	1.78	1.71
26	4.23	3.37	2.98	2.74	2.59	2.47	2.39	2.32	2.27	2.22	2.15	2.07	1.99	1.94	1.82	1.78	1.76	1.69
27	4.21	3.35	2.96	2.73	2.57	2.46	2.37	2.31	2.25	2.20	2.13	2.06	1.97	1.92	1.81	1.76	1.74	1.67
28	4.20	3.34	2.95	2.71	2.56	2.45	2.36	2.29	2.24	2.19	2.12	2.04	1.96	1.91	1.79	1.75	1.73	1.65
29	4.18	3.33	2.93	2.70	2.55	2.43	2.35	2.28	2.22	2.18	2.10	2.03	1.94	1.89	1.77	1.73	1.71	1.64
30	4.17	3.32	2.92	2.69	2.53	2.42	2.33	2.27	2.21	2.16	2.09	2.01	1.93	1.88	1.76	1.72	1.70	1.62
40	4.08	3.23	2.84	2.61	2.45	2.34	2.25	2.18	2.12	2.08	2.00	1.92	1.84	1.78	1.66	1.61	1.59	1.51
60	4.00	3.15	2.76	2.53	2.37	2.25	2.17	2.10	2.04	1.99	1.92	1.84	1.75	1.69	1.56	1.51	1.48	1.39
80	3.96	3.11	2.72	2.49	2.33	2.21	2.13	2.06	2.00	1.95	1.88	1.79	1.70	1.64	1.51	1.45	1.43	1.33
100	3.94	3.09	2.70	2.46	2.31	2.19	2.10	2.03	1.97	1.93	1.85	1.77	1.68	1.62	1.48	1.42	1.39	1.28
120	3.92	3.07	2.68	2.45	2.29	2.18	2.09	2.02	1.96	1.91	1.83	1.75	1.66	1.60	1.46	1.40	1.37	1.26
∞	3.84	3.00	2.61	2.37	2.21	2.10	2.01	1.94	1.88	1.83	1.75	1.67	1.57	1.51	1.35	1.28	1.25	1.03

Tabla 9C. Valores críticos $F_{(\alpha;\nu_1,\nu_2)}$ de la distribución F.

$p = 0.975$ $\alpha = 0.025$

ν_2 \ ν_1	1	2	3	4	5	6	7	8	9	10	12	15	20	25	50	75	100	∞
1	648.	799.	864.	900.	922.	937.	948.	957.	963.	969.	977.	985.	993.	998.	1008.	1011.	1013.	1018.
2	38.51	39.00	39.17	39.25	39.30	39.33	39.36	39.37	39.39	39.40	39.41	39.43	39.45	39.46	39.48	39.48	39.49	39.50
3	17.44	16.04	15.44	15.10	14.88	14.73	14.62	14.54	14.47	14.42	14.34	14.25	14.17	14.12	14.01	13.97	13.96	13.90
4	12.22	10.65	9.98	9.60	9.36	9.20	9.07	8.98	8.90	8.84	8.75	8.66	8.56	8.50	8.38	8.34	8.32	8.26
5	10.01	8.43	7.76	7.39	7.15	6.98	6.85	6.76	6.68	6.62	6.52	6.43	6.33	6.27	6.14	6.10	6.08	6.02
6	8.81	7.26	6.60	6.23	5.99	5.82	5.70	5.60	5.52	5.46	5.37	5.27	5.17	5.11	4.98	4.94	4.92	4.85
7	8.07	6.54	5.89	5.52	5.29	5.12	4.99	4.90	4.82	4.76	4.67	4.57	4.47	4.40	4.28	4.23	4.21	4.14
8	7.57	6.06	5.42	5.05	4.82	4.65	4.53	4.43	4.36	4.30	4.20	4.10	4.00	3.94	3.81	3.76	3.74	3.67
9	7.21	5.71	5.08	4.72	4.48	4.32	4.20	4.10	4.03	3.96	3.87	3.77	3.67	3.60	3.47	3.43	3.40	3.33
10	6.94	5.46	4.83	4.47	4.24	4.07	3.95	3.85	3.78	3.72	3.62	3.52	3.42	3.35	3.22	3.18	3.15	3.08
11	6.72	5.26	4.63	4.28	4.04	3.88	3.76	3.66	3.59	3.53	3.43	3.33	3.23	3.16	3.03	2.98	2.96	2.88
12	6.55	5.10	4.47	4.12	3.89	3.73	3.61	3.51	3.44	3.37	3.28	3.18	3.07	3.01	2.87	2.82	2.80	2.73
13	6.41	4.97	4.35	4.00	3.77	3.60	3.48	3.39	3.31	3.25	3.15	3.05	2.95	2.88	2.74	2.70	2.67	2.60
14	6.30	4.86	4.24	3.89	3.66	3.50	3.38	3.29	3.21	3.15	3.05	2.95	2.84	2.78	2.64	2.59	2.56	2.49
15	6.20	4.77	4.15	3.80	3.58	3.41	3.29	3.20	3.12	3.06	2.96	2.86	2.76	2.69	2.55	2.50	2.47	2.40
16	6.12	4.69	4.08	3.73	3.50	3.34	3.22	3.12	3.05	2.99	2.89	2.79	2.68	2.61	2.47	2.42	2.40	2.32
17	6.04	4.62	4.01	3.66	3.44	3.28	3.16	3.06	2.98	2.92	2.82	2.72	2.62	2.55	2.41	2.35	2.33	2.25
18	5.98	4.56	3.95	3.61	3.38	3.22	3.10	3.01	2.93	2.87	2.77	2.67	2.56	2.49	2.35	2.30	2.27	2.19
19	5.92	4.51	3.90	3.56	3.33	3.17	3.05	2.96	2.88	2.82	2.72	2.62	2.51	2.44	2.30	2.24	2.22	2.13
20	5.87	4.46	3.86	3.51	3.29	3.13	3.01	2.91	2.84	2.77	2.68	2.57	2.46	2.40	2.25	2.20	2.17	2.09
21	5.83	4.42	3.82	3.48	3.25	3.09	2.97	2.87	2.80	2.73	2.64	2.53	2.42	2.36	2.21	2.16	2.13	2.04
22	5.79	4.38	3.78	3.44	3.22	3.05	2.93	2.84	2.76	2.70	2.60	2.50	2.39	2.32	2.17	2.12	2.09	2.00
23	5.75	4.35	3.75	3.41	3.18	3.02	2.90	2.81	2.73	2.67	2.57	2.47	2.36	2.29	2.14	2.08	2.06	1.97
24	5.72	4.32	3.72	3.38	3.15	2.99	2.87	2.78	2.70	2.64	2.54	2.44	2.33	2.26	2.11	2.05	2.02	1.94
25	5.69	4.29	3.69	3.35	3.13	2.97	2.85	2.75	2.68	2.61	2.51	2.41	2.30	2.23	2.08	2.02	2.00	1.91
26	5.66	4.27	3.67	3.33	3.10	2.94	2.82	2.73	2.65	2.59	2.49	2.39	2.28	2.21	2.05	2.00	1.97	1.88
27	5.63	4.24	3.65	3.31	3.08	2.92	2.80	2.71	2.63	2.57	2.47	2.36	2.25	2.18	2.03	1.97	1.94	1.85
28	5.61	4.22	3.63	3.29	3.06	2.90	2.78	2.69	2.61	2.55	2.45	2.34	2.23	2.16	2.01	1.95	1.92	1.83
29	5.59	4.20	3.61	3.27	3.04	2.88	2.76	2.67	2.59	2.53	2.43	2.32	2.21	2.14	1.99	1.93	1.90	1.81
30	5.57	4.18	3.59	3.25	3.03	2.87	2.75	2.65	2.57	2.51	2.41	2.31	2.20	2.12	1.97	1.91	1.88	1.79
40	5.42	4.05	3.46	3.13	2.90	2.74	2.62	2.53	2.45	2.39	2.29	2.18	2.07	1.99	1.83	1.77	1.74	1.64
60	5.29	3.93	3.34	3.01	2.79	2.63	2.51	2.41	2.33	2.27	2.17	2.06	1.94	1.87	1.70	1.63	1.60	1.48
80	5.22	3.86	3.28	2.95	2.73	2.57	2.45	2.35	2.28	2.21	2.11	2.00	1.88	1.81	1.63	1.56	1.53	1.40
100	5.18	3.83	3.25	2.92	2.70	2.54	2.42	2.32	2.24	2.18	2.08	1.97	1.85	1.77	1.59	1.52	1.48	1.35
120	5.15	3.80	3.23	2.89	2.67	2.52	2.39	2.30	2.22	2.16	2.05	1.94	1.82	1.75	1.56	1.49	1.45	1.31
∞	5.03	3.69	3.12	2.79	2.57	2.41	2.29	2.19	2.11	2.05	1.95	1.83	1.71	1.63	1.43	1.35	1.30	1.04

Tabla 9D. Valores críticos $F_{(\alpha;\nu_1,\nu_2)}$ de la distribución F.

p = 0.99　　　　　　　　　　　　　　　　　　　　　　　　　　　　　　α = 0.01

ν_2	ν_1 1	2	3	4	5	6	7	8	9	10	12	15	20	25	50	75	100	∞
1	4052.	4999.	5403.	5625.	5764.	5859.	5928.	5981.	6022.	6056.	6106.	6157.	6209.	6240.	6303.	6324.	6334.	6366.
2	98.50	99.00	99.17	99.25	99.30	99.33	99.36	99.37	99.39	99.40	99.42	99.43	99.45	99.46	99.48	99.49	99.49	99.50
3	34.12	30.82	29.46	28.71	28.24	27.91	27.67	27.49	27.35	27.23	27.05	26.87	26.69	26.58	26.35	26.28	26.24	26.13
4	21.20	18.00	16.69	15.98	15.52	15.21	14.98	14.80	14.66	14.55	14.37	14.20	14.02	13.91	13.69	13.61	13.58	13.46
5	16.26	13.27	12.06	11.39	10.97	10.67	10.46	10.29	10.16	10.05	9.89	9.72	9.55	9.45	9.24	9.17	9.13	9.02
6	13.75	10.92	9.78	9.15	8.75	8.47	8.26	8.10	7.98	7.87	7.72	7.56	7.40	7.30	7.09	7.02	6.99	6.88
7	12.25	9.55	8.45	7.85	7.46	7.19	6.99	6.84	6.72	6.62	6.47	6.31	6.16	6.06	5.86	5.79	5.75	5.65
8	11.26	8.65	7.59	7.01	6.63	6.37	6.18	6.03	5.91	5.81	5.67	5.52	5.36	5.26	5.07	5.00	4.96	4.86
9	10.56	8.02	6.99	6.42	6.06	5.80	5.61	5.47	5.35	5.26	5.11	4.96	4.81	4.71	4.52	4.45	4.41	4.31
10	10.04	7.56	6.55	5.99	5.64	5.39	5.20	5.06	4.94	4.85	4.71	4.56	4.41	4.31	4.12	4.05	4.01	3.91
11	9.65	7.21	6.22	5.67	5.32	5.07	4.89	4.74	4.63	4.54	4.40	4.25	4.10	4.01	3.81	3.74	3.71	3.60
12	9.33	6.93	5.95	5.41	5.06	4.82	4.64	4.50	4.39	4.30	4.16	4.01	3.86	3.76	3.57	3.50	3.47	3.36
13	9.07	6.70	5.74	5.21	4.86	4.62	4.44	4.30	4.19	4.10	3.96	3.82	3.66	3.57	3.38	3.31	3.27	3.17
14	8.86	6.51	5.56	5.04	4.69	4.46	4.28	4.14	4.03	3.94	3.80	3.66	3.51	3.41	3.22	3.15	3.11	3.01
15	8.68	6.36	5.42	4.89	4.56	4.32	4.14	4.00	3.89	3.80	3.67	3.52	3.37	3.28	3.08	3.01	2.98	2.87
16	8.53	6.23	5.29	4.77	4.44	4.20	4.03	3.89	3.78	3.69	3.55	3.41	3.26	3.16	2.97	2.90	2.86	2.75
17	8.40	6.11	5.18	4.67	4.34	4.10	3.93	3.79	3.68	3.59	3.46	3.31	3.16	3.07	2.87	2.80	2.76	2.65
18	8.29	6.01	5.09	4.58	4.25	4.01	3.84	3.71	3.60	3.51	3.37	3.23	3.08	2.98	2.78	2.71	2.68	2.57
19	8.18	5.93	5.01	4.50	4.17	3.94	3.77	3.63	3.52	3.43	3.30	3.15	3.00	2.91	2.71	2.64	2.60	2.49
20	8.10	5.85	4.94	4.43	4.10	3.87	3.70	3.56	3.46	3.37	3.23	3.09	2.94	2.84	2.64	2.57	2.54	2.42
21	8.02	5.78	4.87	4.37	4.04	3.81	3.64	3.51	3.40	3.31	3.17	3.03	2.88	2.79	2.58	2.51	2.48	2.36
22	7.95	5.72	4.82	4.31	3.99	3.76	3.59	3.45	3.35	3.26	3.12	2.98	2.83	2.73	2.53	2.46	2.42	2.31
23	7.88	5.66	4.76	4.26	3.94	3.71	3.54	3.41	3.30	3.21	3.07	2.93	2.78	2.69	2.48	2.41	2.37	2.26
24	7.82	5.61	4.72	4.22	3.90	3.67	3.50	3.36	3.26	3.17	3.03	2.89	2.74	2.64	2.44	2.37	2.33	2.21
25	7.77	5.57	4.68	4.18	3.85	3.63	3.46	3.32	3.22	3.13	2.99	2.85	2.70	2.60	2.40	2.33	2.29	2.17
26	7.72	5.53	4.64	4.14	3.82	3.59	3.42	3.29	3.18	3.09	2.96	2.81	2.66	2.57	2.36	2.29	2.25	2.13
27	7.68	5.49	4.60	4.11	3.78	3.56	3.39	3.26	3.15	3.06	2.93	2.78	2.63	2.54	2.33	2.26	2.22	2.10
28	7.64	5.45	4.57	4.07	3.75	3.53	3.36	3.23	3.12	3.03	2.90	2.75	2.60	2.51	2.30	2.23	2.19	2.07
29	7.60	5.42	4.54	4.04	3.73	3.50	3.33	3.20	3.09	3.00	2.87	2.73	2.57	2.48	2.27	2.20	2.16	2.04
30	7.56	5.39	4.51	4.02	3.70	3.47	3.30	3.17	3.07	2.98	2.84	2.70	2.55	2.45	2.25	2.17	2.13	2.01
40	7.31	5.18	4.31	3.83	3.51	3.29	3.12	2.99	2.89	2.80	2.66	2.52	2.37	2.27	2.06	1.98	1.94	1.81
60	7.08	4.98	4.13	3.65	3.34	3.12	2.95	2.82	2.72	2.63	2.50	2.35	2.20	2.10	1.88	1.79	1.75	1.60
80	6.96	4.88	4.04	3.56	3.26	3.04	2.87	2.74	2.64	2.55	2.42	2.27	2.12	2.01	1.79	1.70	1.65	1.50
100	6.90	4.82	3.98	3.51	3.21	2.99	2.82	2.69	2.59	2.50	2.37	2.22	2.07	1.97	1.74	1.65	1.60	1.43
120	6.85	4.79	3.95	3.48	3.17	2.96	2.79	2.66	2.56	2.47	2.34	2.19	2.03	1.93	1.70	1.61	1.56	1.38
∞	6.64	4.61	3.78	3.32	3.02	2.80	2.64	2.51	2.41	2.32	2.19	2.04	1.88	1.77	1.53	1.42	1.36	1.05

Tabla 9E. Valores críticos $F_{(\alpha;\nu_1,\nu_2)}$ de la distribución F.

p = 0.995 $\qquad$ $\alpha = 0.005$

ν_2 \ ν_1	1	2	3	4	5	6	7	8	9	10	12	15	20	25	50	75	100	∞
1	16211.	19999.	21615.	22500.	23056.	23437.	23715.	23925.	24091.	24224.	24426.	24630.	24836.	24960.	25211.	25295.	25337.	25463.
2	198.50	199.00	199.17	199.25	199.30	199.33	199.36	199.37	199.39	199.40	199.42	199.43	199.45	199.46	199.48	199.49	199.49	199.50
3	55.55	49.80	47.47	46.19	45.39	44.84	44.43	44.13	43.88	43.69	43.39	43.08	42.78	42.59	42.21	42.09	42.02	41.83
4	31.33	26.28	24.26	23.15	22.46	21.97	21.62	21.35	21.14	20.97	20.70	20.44	20.17	20.00	19.67	19.55	19.50	19.33
5	22.78	18.31	16.53	15.56	14.94	14.51	14.20	13.96	13.77	13.62	13.38	13.15	12.90	12.76	12.45	12.35	12.30	12.15
6	18.63	14.54	12.92	12.03	11.46	11.07	10.79	10.57	10.39	10.25	10.03	9.81	9.59	9.45	9.17	9.07	9.03	8.88
7	16.24	12.40	10.88	10.05	9.52	9.16	8.89	8.68	8.51	8.38	8.18	7.97	7.75	7.62	7.35	7.26	7.22	7.08
8	14.69	11.04	9.60	8.81	8.30	7.95	7.69	7.50	7.34	7.21	7.01	6.81	6.61	6.48	6.22	6.13	6.09	5.95
9	13.61	10.11	8.72	7.96	7.47	7.13	6.88	6.69	6.54	6.42	6.23	6.03	5.83	5.71	5.45	5.37	5.32	5.19
10	12.83	9.43	8.08	7.34	6.87	6.54	6.30	6.12	5.97	5.85	5.66	5.47	5.27	5.15	4.90	4.82	4.77	4.64
11	12.23	8.91	7.60	6.88	6.42	6.10	5.86	5.68	5.54	5.42	5.24	5.05	4.86	4.74	4.49	4.40	4.36	4.23
12	11.75	8.51	7.23	6.52	6.07	5.76	5.52	5.35	5.20	5.09	4.91	4.72	4.53	4.41	4.17	4.08	4.04	3.91
13	11.37	8.19	6.93	6.23	5.79	5.48	5.25	5.08	4.94	4.82	4.64	4.46	4.27	4.15	3.91	3.82	3.78	3.65
14	11.06	7.92	6.68	6.00	5.56	5.26	5.03	4.86	4.72	4.60	4.43	4.25	4.06	3.94	3.70	3.61	3.57	3.44
15	10.80	7.70	6.48	5.80	5.37	5.07	4.85	4.67	4.54	4.42	4.25	4.07	3.88	3.77	3.52	3.44	3.39	3.26
16	10.58	7.51	6.30	5.64	5.21	4.91	4.69	4.52	4.38	4.27	4.10	3.92	3.73	3.62	3.37	3.29	3.25	3.11
17	10.38	7.35	6.16	5.50	5.07	4.78	4.56	4.39	4.25	4.14	3.97	3.79	3.61	3.49	3.25	3.16	3.12	2.99
18	10.22	7.21	6.03	5.37	4.96	4.66	4.44	4.28	4.14	4.03	3.86	3.68	3.50	3.38	3.14	3.05	3.01	2.87
19	10.07	7.09	5.92	5.27	4.85	4.56	4.34	4.18	4.04	3.93	3.76	3.59	3.40	3.29	3.04	2.96	2.91	2.78
20	9.94	6.99	5.82	5.17	4.76	4.47	4.26	4.09	3.96	3.85	3.68	3.50	3.32	3.20	2.96	2.87	2.83	2.69
21	9.83	6.89	5.73	5.09	4.68	4.39	4.18	4.01	3.88	3.77	3.60	3.43	3.24	3.13	2.88	2.80	2.75	2.62
22	9.73	6.81	5.65	5.02	4.61	4.32	4.11	3.94	3.81	3.70	3.54	3.36	3.18	3.06	2.82	2.73	2.69	2.55
23	9.63	6.73	5.58	4.95	4.54	4.26	4.05	3.88	3.75	3.64	3.47	3.30	3.12	3.00	2.76	2.67	2.62	2.49
24	9.55	6.66	5.52	4.89	4.49	4.20	3.99	3.83	3.69	3.59	3.42	3.25	3.06	2.95	2.70	2.61	2.57	2.43
25	9.48	6.60	5.46	4.84	4.43	4.15	3.94	3.78	3.64	3.54	3.37	3.20	3.01	2.90	2.65	2.56	2.52	2.38
26	9.41	6.54	5.41	4.79	4.38	4.10	3.89	3.73	3.60	3.49	3.33	3.15	2.97	2.85	2.61	2.52	2.47	2.33
27	9.34	6.49	5.36	4.74	4.34	4.06	3.85	3.69	3.56	3.45	3.28	3.11	2.93	2.81	2.57	2.48	2.43	2.29
28	9.28	6.44	5.32	4.70	4.30	4.02	3.81	3.65	3.52	3.41	3.25	3.07	2.89	2.77	2.53	2.44	2.39	2.25
29	9.23	6.40	5.28	4.66	4.26	3.98	3.77	3.61	3.48	3.38	3.21	3.04	2.86	2.74	2.49	2.40	2.36	2.21
30	9.18	6.35	5.24	4.62	4.23	3.95	3.74	3.58	3.45	3.34	3.18	3.01	2.82	2.71	2.46	2.37	2.32	2.18
40	8.83	6.07	4.98	4.37	3.99	3.71	3.51	3.35	3.22	3.12	2.95	2.78	2.60	2.48	2.23	2.14	2.09	1.93
60	8.49	5.79	4.73	4.14	3.76	3.49	3.29	3.13	3.01	2.90	2.74	2.57	2.39	2.27	2.01	1.91	1.86	1.69
80	8.33	5.67	4.61	4.03	3.65	3.39	3.19	3.03	2.91	2.80	2.64	2.47	2.29	2.17	1.90	1.80	1.75	1.57
100	8.24	5.59	4.54	3.96	3.59	3.33	3.13	2.97	2.85	2.74	2.58	2.41	2.23	2.11	1.84	1.74	1.68	1.49
120	8.18	5.54	4.50	3.92	3.55	3.28	3.09	2.93	2.81	2.71	2.54	2.37	2.19	2.07	1.80	1.69	1.64	1.43
∞	7.88	5.30	4.28	3.72	3.35	3.09	2.90	2.75	2.62	2.52	2.36	2.19	2.00	1.88	1.59	1.47	1.40	1.05

10. Distribución del estadístico d de Durbin-Watson

Se define el estadístico de Durbin-Watson

$$d = \frac{\sum_{i=2}^{n} (e_i - e_{i-1})^2}{\sum_{i=1}^{n} e_i^2}$$

donde los e_i son los residuales del modelo lineal

$$e_i = y_i - \hat{\beta}_0 - \hat{\beta}_1 x_{i1} - \ldots - \hat{\beta}_k x_{ik},$$

con $i = 1, \ldots, n$.

$H_0 : \rho = 0$ vs. $H_a : \rho \neq 0$

Inconclusa

Rechazar   Aceptar

d_L d_U

d
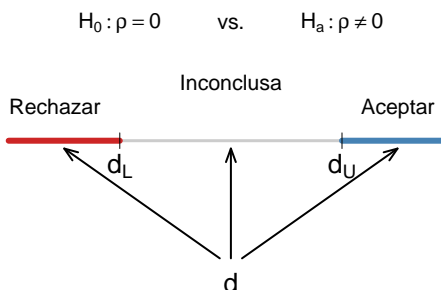
Prueba para autocorrelacíón positiva ($\rho > 0$) de significancia α:

Si	$d < \mathrm{dL}_{(\alpha;n,k)}$	Los datos sugieren autocorrelación positiva
Si	$d > \mathrm{dU}_{(\alpha;n,k)}$	No hay evidencia de autocorrelación positiva
Si	$\mathrm{dL}_{(\alpha;n,k)} < d < \mathrm{dU}_{(\alpha;n,k)}$	La prueba es inconcluyente

Prueba para autocorrelación negativa ($\rho < 0$) de significancia α:

Si	$4 - d < \mathrm{dL}_{(\alpha;n,k)}$	Los datos sugieren autocorrelación negativa
Si	$4 - d > \mathrm{dU}_{(\alpha;n,k)}$	No hay evidencia de autocorrelación negativa
Si	$\mathrm{dL}_{(\alpha;n,k)} < 4 - d < \mathrm{dU}_{(\alpha;n,k)}$	La prueba es inconcluyente

Prueba de dos colas para autocorrelación ($|\rho| > 0$) de significancia α:

Si	$d < \mathrm{dL}_{(\frac{\alpha}{2};n,k)}$ 'o $4 - d < \mathrm{dL}_{(\frac{\alpha}{2};n,k)}$	Los datos sugieren autocorrelación
Si	$d > \mathrm{dU}_{(\frac{\alpha}{2};n,k)}$ 'o $4 - d > \mathrm{dU}_{(\frac{\alpha}{2};n,k)}$	No hay evidencia de autocorrelación
	En otro caso	La prueba es inconcluyente

Tabla 10A.1 Cotas críticas $dL_{(\alpha;n,k)}$, $dU_{(\alpha;n,k)}$ del estadístico de Durbin-Watson.

$\alpha = 0.01$

n	k=1 dL	k=1 dU	k=2 dL	k=2 dU	k=3 dL	k=3 dU	k=4 dL	k=4 dU	k=5 dL	k=5 dU	k=6 dL	k=6 dU	k=7 dL	k=7 dU	k=8 dL	k=8 dU	k=9 dL	k=9 dU	k=10 dL	k=10 dU	k=11 dL	k=11 dU
6	0.390	1.142	.	1.676	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
7	0.435	1.036	0.294	1.489	.	2.102	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
8	0.498	1.004	0.346	1.390	0.229	1.875	.	2.433	.	.	.	.	.	.	.	.	.	.	.	.	.	.
9	0.554	0.998	0.409	1.332	0.279	1.734	0.183	2.194	.	2.690	.	.	.	.	.	.	.	.	.	.	.	.
10	0.604	1.000	0.466	1.297	0.340	1.641	0.230	2.029	0.150	2.453	.	2.893	.	.	.	.	.	.	.	.	.	.
11	0.653	1.010	0.519	1.274	0.396	1.574	0.286	1.912	0.193	2.280	0.125	2.664	.	3.053	.	.	.	.	.	.	.	.
12	0.698	1.023	0.570	1.261	0.448	1.526	0.339	1.826	0.244	2.149	0.164	2.490	0.105	2.838	.	3.182	.	.	.	.	.	.
13	0.739	1.039	0.616	1.254	0.499	1.491	0.391	1.757	0.294	2.049	0.211	2.354	0.140	2.667	0.090	2.982	.	3.287	.	.	.	.
14	0.776	1.054	0.660	1.251	0.547	1.465	0.441	1.704	0.343	1.967	0.257	2.244	0.183	2.530	0.122	2.811	0.078	3.101	.	3.374	.	.
15	0.811	1.071	0.700	1.253	0.592	1.445	0.487	1.663	0.391	1.900	0.303	2.153	0.226	2.415	0.161	2.681	0.107	2.944	0.068	3.201	.	3.446
16	0.844	1.087	0.738	1.256	0.632	1.433	0.532	1.631	0.437	1.846	0.349	2.078	0.269	2.319	0.200	2.566	0.142	2.811	0.094	3.053	0.060	3.286
17	0.874	1.103	0.773	1.260	0.672	1.423	0.574	1.604	0.480	1.803	0.393	2.016	0.313	2.237	0.241	2.466	0.179	2.697	0.127	2.924	0.084	3.146
18	0.902	1.118	0.805	1.265	0.708	1.416	0.613	1.584	0.522	1.767	0.435	1.962	0.355	2.169	0.282	2.382	0.217	2.597	0.160	2.813	0.114	3.023
19	0.928	1.132	0.835	1.270	0.742	1.410	0.650	1.567	0.561	1.737	0.476	1.919	0.396	2.109	0.322	2.307	0.255	2.510	0.195	2.714	0.144	2.915
20	0.953	1.147	0.863	1.278	0.773	1.408	0.685	1.554	0.598	1.712	0.515	1.881	0.436	2.060	0.362	2.244	0.293	2.434	0.232	2.625	0.178	2.816
21	0.976	1.161	0.890	1.284	0.803	1.408	0.718	1.543	0.634	1.691	0.552	1.848	0.474	2.015	0.400	2.189	0.332	2.367	0.268	2.547	0.212	2.729
22	0.997	1.174	0.915	1.290	0.832	1.407	0.748	1.535	0.667	1.673	0.587	1.821	0.510	1.978	0.437	2.140	0.369	2.308	0.305	2.479	0.246	2.650
23	1.017	1.186	0.938	1.298	0.857	1.406	0.778	1.528	0.698	1.658	0.620	1.797	0.545	1.944	0.473	2.098	0.404	2.255	0.340	2.417	0.281	2.580
24	1.037	1.199	0.960	1.305	0.882	1.407	0.804	1.523	0.728	1.646	0.652	1.777	0.578	1.915	0.507	2.060	0.439	2.209	0.375	2.362	0.315	2.518
25	1.055	1.211	0.981	1.312	0.906	1.409	0.831	1.519	0.756	1.635	0.682	1.759	0.610	1.890	0.540	2.026	0.473	2.168	0.409	2.313	0.348	2.461
26	1.072	1.222	1.001	1.318	0.928	1.410	0.855	1.516	0.783	1.626	0.711	1.744	0.641	1.867	0.571	1.997	0.505	2.131	0.441	2.269	0.381	2.410
27	1.088	1.233	1.019	1.325	0.950	1.413	0.879	1.513	0.808	1.618	0.738	1.729	0.669	1.847	0.602	1.971	0.536	2.097	0.473	2.229	0.413	2.363
28	1.104	1.244	1.037	1.332	0.969	1.415	0.900	1.512	0.832	1.611	0.764	1.717	0.696	1.829	0.631	1.947	0.566	2.068	0.504	2.193	0.444	2.321
29	1.119	1.254	1.054	1.339	0.988	1.418	0.922	1.510	0.855	1.606	0.788	1.707	0.723	1.814	0.658	1.925	0.595	2.041	0.534	2.160	0.474	2.282
30	1.133	1.264	1.070	1.346	1.006	1.422	0.942	1.510	0.877	1.601	0.812	1.698	0.748	1.799	0.684	1.906	0.622	2.017	0.562	2.131	0.503	2.248
31	1.147	1.273	1.086	1.352	1.024	1.425	0.960	1.510	0.897	1.598	0.834	1.690	0.772	1.787	0.710	1.890	0.649	1.995	0.590	2.104	0.531	2.216
32	1.159	1.281	1.100	1.358	1.040	1.429	0.979	1.511	0.917	1.594	0.856	1.683	0.794	1.776	0.734	1.874	0.674	1.975	0.615	2.079	0.558	2.187
33	1.172	1.290	1.114	1.364	1.055	1.432	0.996	1.512	0.936	1.591	0.876	1.677	0.817	1.766	0.757	1.860	0.698	1.957	0.641	2.057	0.585	2.160
34	1.184	1.299	1.127	1.370	1.070	1.435	1.012	1.513	0.954	1.589	0.895	1.671	0.837	1.757	0.779	1.847	0.722	1.940	0.665	2.037	0.610	2.136
35	1.195	1.307	1.140	1.376	1.085	1.439	1.028	1.515	0.972	1.587	0.914	1.666	0.858	1.749	0.800	1.836	0.744	1.925	0.688	2.017	0.634	2.113
36	1.207	1.315	1.153	1.382	1.098	1.442	1.044	1.516	0.988	1.586	0.932	1.662	0.876	1.742	0.821	1.825	0.766	1.912	0.711	2.000	0.657	2.093
37	1.217	1.322	1.165	1.388	1.112	1.446	1.059	1.517	1.004	1.585	0.950	1.658	0.895	1.736	0.840	1.815	0.787	1.899	0.733	1.985	0.681	2.072
38	1.227	1.331	1.176	1.393	1.125	1.450	1.072	1.518	1.019	1.585	0.966	1.655	0.913	1.729	0.859	1.807	0.807	1.887	0.754	1.970	0.702	2.055
39	1.237	1.337	1.187	1.399	1.137	1.453	1.086	1.520	1.034	1.584	0.982	1.652	0.930	1.724	0.878	1.799	0.826	1.877	0.774	1.957	0.723	2.039
40	1.246	1.344	1.198	1.404	1.148	1.456	1.098	1.522	1.048	1.584	0.997	1.650	0.946	1.719	0.895	1.792	0.845	1.866	0.794	1.944	0.744	2.024
41	1.255	1.351	1.208	1.409	1.160	1.460	1.111	1.524	1.062	1.583	1.012	1.648	0.962	1.715	0.912	1.785	0.862	1.857	0.813	1.932	0.764	2.010
42	1.264	1.357	1.218	1.414	1.170	1.464	1.123	1.526	1.074	1.583	1.026	1.646	0.977	1.711	0.928	1.779	0.880	1.849	0.830	1.921	0.782	1.996
43	1.272	1.363	1.227	1.418	1.181	1.467	1.135	1.528	1.087	1.583	1.040	1.644	0.992	1.707	0.944	1.773	0.896	1.841	0.848	1.911	0.800	1.984
44	1.280	1.369	1.236	1.423	1.191	1.471	1.146	1.530	1.100	1.584	1.053	1.643	1.006	1.704	0.959	1.768	0.912	1.834	0.865	1.902	0.818	1.972
45	1.288	1.376	1.245	1.428	1.201	1.474	1.156	1.531	1.111	1.584	1.066	1.642	1.019	1.702	0.974	1.764	0.927	1.827	0.881	1.893	0.835	1.962
46	1.296	1.382	1.253	1.433	1.210	1.477	1.167	1.534	1.122	1.585	1.078	1.641	1.033	1.699	0.988	1.759	0.942	1.822	0.897	1.885	0.852	1.951
47	1.303	1.387	1.262	1.437	1.219	1.481	1.177	1.536	1.133	1.585	1.090	1.640	1.046	1.697	1.001	1.755	0.957	1.815	0.912	1.878	0.868	1.942
48	1.310	1.392	1.270	1.441	1.228	1.484	1.187	1.538	1.144	1.586	1.101	1.639	1.058	1.694	1.014	1.751	0.970	1.810	0.927	1.871	0.884	1.933
49	1.318	1.398	1.278	1.446	1.237	1.488	1.196	1.540	1.155	1.587	1.112	1.638	1.070	1.692	1.027	1.747	0.984	1.805	0.941	1.864	0.898	1.926
50	1.324	1.403	1.285	1.451	1.246	1.491	1.205	1.542	1.164	1.588	1.123	1.637	1.081	1.690	1.039	1.743	0.997	1.800	0.955	1.858	0.913	1.919
55	1.355	1.427	1.320	1.466	1.283	1.506	1.247	1.549	1.209	1.592	1.172	1.640	1.134	1.686	1.095	1.734	1.057	1.785	1.018	1.837	0.979	1.890
60	1.383	1.449	1.350	1.484	1.316	1.520	1.283	1.558	1.249	1.598	1.214	1.642	1.179	1.682	1.143	1.725	1.108	1.771	1.072	1.817	1.036	1.865
65	1.408	1.468	1.377	1.500	1.346	1.534	1.315	1.569	1.283	1.605	1.251	1.645	1.218	1.680	1.186	1.720	1.153	1.761	1.120	1.803	1.086	1.845
70	1.428	1.485	1.401	1.515	1.372	1.546	1.343	1.578	1.314	1.611	1.284	1.649	1.253	1.680	1.223	1.716	1.192	1.753	1.162	1.792	1.130	1.831
75	1.449	1.501	1.422	1.529	1.394	1.557	1.367	1.586	1.340	1.617	1.313	1.653	1.284	1.681	1.256	1.714	1.228	1.749	1.199	1.784	1.170	1.819
80	1.466	1.515	1.441	1.541	1.416	1.568	1.390	1.595	1.364	1.624	1.339	1.657	1.312	1.683	1.285	1.714	1.259	1.745	1.232	1.777	1.205	1.803
85	1.482	1.528	1.458	1.553	1.435	1.578	1.411	1.603	1.386	1.630	1.362	1.662	1.338	1.685	1.312	1.714	1.287	1.743	1.261	1.772	1.235	1.797
90	1.497	1.541	1.474	1.563	1.452	1.587	1.429	1.611	1.406	1.636	1.384	1.666	1.359	1.687	1.336	1.716	1.312	1.741	1.289	1.769	1.264	1.794
95	1.510	1.552	1.489	1.573	1.468	1.596	1.446	1.618	1.425	1.642	1.403	1.670	1.380	1.690	1.359	1.717	1.336	1.741	1.313	1.767	1.290	1.790
100	1.523	1.562	1.502	1.582	1.482	1.604	1.462	1.625	1.441	1.647	1.420	1.690	1.399	1.693	1.378	1.726	1.357	1.741	1.335	1.765	1.314	1.790
125	1.573	1.605	1.558	1.622	1.541	1.638	1.525	1.655	1.509	1.673	1.492	1.707	1.475	1.708	1.458	1.737	1.441	1.752	1.424	1.763	1.407	1.783
150	1.611	1.637	1.598	1.651	1.585	1.665	1.571	1.679	1.557	1.693	1.543	1.722	1.529	1.722	1.515	1.747	1.501	1.760	1.487	1.767	1.472	1.782
175	1.640	1.663	1.629	1.674	1.617	1.686	1.606	1.698	1.594	1.710	1.582	1.735	1.570	1.735	1.558	1.757	1.546	1.768	1.534	1.773	1.522	1.786
200	1.664	1.684	1.654	1.694	1.644	1.704	1.634	1.714	1.623	1.725	1.613	1.746	1.602	1.746	1.592	1.767	1.582	1.776	1.571	1.779	1.561	1.791

Tabla 10A.2 Cotas críticas $dL_{(\alpha;n,k)}$, $dU_{(\alpha;n,k)}$ del estadístico de Durbin-Watson.

$\alpha = 0.01$

n	k=12 dL	k=12 dU	k=13 dL	k=13 dU	k=14 dL	k=14 dU	k=15 dL	k=15 dU	k=16 dL	k=16 dU	k=17 dL	k=17 dU	k=18 dL	k=18 dU	k=19 dL	k=19 dU	k=20 dL	k=20 dU	k=25 dL	k=25 dU	k=30 dL	k=30 dU
17	0.053	3.506	·	3.557	·	3.601	·	3.639	·	3.671	·	·	·	·	·	·	·	·	·	·	·	·
18	0.075	3.358	0.047	3.420	0.043	3.474	0.038	3.521	·	3.562	·	3.700	·	·	·	·	·	·	·	·	·	·
19	0.102	3.227	0.067	3.297	0.061	3.358	0.055	3.412	·	3.459	·	3.598	·	3.725	·	·	·	·	·	·	·	·
20	0.131	3.109	0.093	3.185	0.084	3.252	0.077	3.311	0.035	3.363	·	3.501	·	3.629	·	3.747	·	·	·	·	·	·
21	0.162	3.004	0.119	3.084	0.109	3.155	0.100	3.218	0.050	3.274	·	3.410	·	3.538	·	3.657	·	3.766	·	·	·	·
22	0.194	2.909	0.148	2.991	0.136	3.065	0.125	3.131	0.070	3.191	0.032	3.326	·	3.452	·	3.572	·	3.682	·	·	·	·
23	0.227	2.822	0.178	2.906	0.165	2.982	0.152	3.051	0.092	3.112	0.046	3.245	0.029	3.371	0.027	3.490	·	3.602	·	·	·	·
24	0.260	2.744	0.209	2.829	0.194	2.906	0.180	2.976	0.116	3.040	0.065	3.169	0.042	3.294	0.039	3.412	·	3.524	·	·	·	·
25	0.292	2.674	0.241	2.759	0.224	2.836	0.208	2.907	0.141	2.972	0.085	3.098	0.060	3.220	0.055	3.338	0.025	3.450	·	·	·	·
26	0.325	2.609	0.272	2.694	0.254	2.772	0.237	2.843	0.167	2.909	0.107	3.032	0.079	3.152	0.073	3.268	0.036	3.379	·	3.836	·	·
27	0.356	2.551	0.303	2.635	0.283	2.713	0.265	2.785	0.194	2.851	0.129	2.970	0.100	3.086	0.093	3.201	0.051	3.310	·	3.775	·	·
28	0.387	2.499	0.333	2.582	0.313	2.659	0.294	2.730	0.222	2.796	0.156	2.912	0.122	3.026	0.114	3.137	0.068	3.246	·	3.713	·	·
29	0.418	2.451	0.364	2.532	0.342	2.609	0.322	2.680	0.249	2.746	0.182	2.858	0.146	2.969	0.137	3.078	0.087	3.184	·	3.653	·	·
30	0.447	2.407	0.393	2.487	0.370	2.562	0.350	2.633	0.277	2.699	0.208	2.808	0.171	2.915	0.160	3.022	0.107	3.126	0.017	3.594	·	3.879
31	0.475	2.367	0.422	2.446	0.398	2.520	0.377	2.589	0.304	2.655	0.234	2.761	0.196	2.865	0.184	2.969	0.129	3.071	0.026	3.535	·	3.832
32	0.503	2.330	0.450	2.407	0.426	2.481	0.404	2.549	0.331	2.614	0.261	2.717	0.221	2.819	0.209	2.919	0.151	3.019	0.037	3.479	·	3.784
33	0.530	2.296	0.477	2.373	0.452	2.444	0.430	2.512	0.357	2.576	0.287	2.675	0.246	2.774	0.233	2.872	0.174	2.969	0.049	3.424	·	3.736
34	0.556	2.265	0.503	2.340	0.478	2.410	0.456	2.478	0.383	2.541	0.313	2.637	0.272	2.733	0.257	2.828	0.197	2.923	0.064	3.370	·	3.688
35	0.581	2.237	0.529	2.310	0.504	2.379	0.480	2.445	0.409	2.507	0.339	2.600	0.297	2.694	0.282	2.786	0.221	2.879	0.079	3.319	0.013	3.640
36	0.605	2.210	0.554	2.282	0.528	2.350	0.504	2.414	0.433	2.476	0.364	2.566	0.322	2.657	0.306	2.747	0.244	2.837	0.096	3.270	0.019	3.593
37	0.628	2.187	0.577	2.256	0.552	2.323	0.528	2.386	0.458	2.447	0.390	2.534	0.346	2.623	0.330	2.711	0.268	2.799	0.114	3.223	0.028	3.547
38	0.651	2.164	0.601	2.231	0.575	2.297	0.551	2.360	0.482	2.419	0.414	2.504	0.371	2.590	0.354	2.676	0.292	2.761	0.133	3.177	0.037	3.501
39	0.673	2.143	0.623	2.210	0.598	2.273	0.573	2.335	0.505	2.393	0.438	2.476	0.395	2.559	0.377	2.643	0.315	2.726	0.151	3.134	0.049	3.456
40	0.694	2.123	0.646	2.189	0.619	2.251	0.594	2.312	0.528	2.369	0.461	2.450	0.418	2.530	0.400	2.612	0.338	2.693	0.171	3.092	0.061	3.413
41	0.715	2.105	0.666	2.169	0.641	2.230	0.616	2.289	0.550	2.346	0.484	2.424	0.441	2.503	0.422	2.582	0.361	2.662	0.191	3.052	0.075	3.371
42	0.734	2.088	0.687	2.150	0.661	2.211	0.636	2.269	0.571	2.325	0.506	2.401	0.464	2.477	0.445	2.554	0.383	2.631	0.211	3.014	0.089	3.330
43	0.753	2.073	0.707	2.134	0.680	2.192	0.655	2.250	0.592	2.305	0.528	2.378	0.486	2.453	0.467	2.528	0.405	2.603	0.232	2.978	0.104	3.291
44	0.771	2.058	0.726	2.118	0.699	2.176	0.675	2.231	0.612	2.286	0.549	2.357	0.507	2.430	0.487	2.503	0.427	2.576	0.252	2.943	0.120	3.252
45	0.790	2.044	0.744	2.103	0.718	2.159	0.694	2.214	0.632	2.267	0.569	2.338	0.528	2.408	0.508	2.479	0.448	2.551	0.272	2.909	0.137	3.215
46	0.807	2.031	0.762	2.089	0.736	2.144	0.712	2.198	0.651	2.250	0.590	2.318	0.548	2.387	0.528	2.456	0.469	2.526	0.292	2.878	0.153	3.184
47	0.824	2.020	0.780	2.076	0.754	2.130	0.729	2.183	0.670	2.234	0.609	2.300	0.569	2.367	0.548	2.435	0.490	2.503	0.312	2.843	0.170	3.152
48	0.840	2.008	0.797	2.063	0.771	2.116	0.746	2.167	0.688	2.219	0.628	2.282	0.588	2.347	0.568	2.414	0.509	2.479	0.332	2.810	0.188	3.126
49	0.856	1.998	0.813	2.051	0.787	2.102	0.763	2.152	0.705	2.205	0.647	2.266	0.607	2.328	0.586	2.394	0.529	2.456	0.351	2.778	0.205	3.097
50	0.871	1.987	0.829	2.041	0.803	2.089	0.780	2.138	0.722	2.192	0.665	2.250	0.625	2.310	0.605	2.374	0.548	2.433	0.371	2.746	0.223	3.071
55	0.940	1.945	0.902	2.002	0.863	2.015	0.824	2.117	0.786	2.119	0.748	2.173	0.711	2.228	0.674	2.272	0.637	2.421	0.464	2.736	0.311	3.048
60	1.001	1.914	0.964	1.963	0.929	1.981	0.893	2.067	0.857	2.075	0.822	2.123	0.787	2.171	0.751	2.217	0.716	2.359	0.549	2.623	0.397	2.908
65	1.054	1.890	1.020	1.935	0.986	1.953	0.952	2.027	0.919	2.038	0.886	2.082	0.852	2.126	0.819	2.172	0.786	2.272	0.626	2.530	0.477	2.791
70	1.099	1.870	1.068	1.911	1.037	1.931	1.005	1.995	0.974	2.009	0.943	2.049	0.911	2.090	0.880	2.131	0.849	2.217	0.696	2.452	0.551	2.693
75	1.141	1.856	1.111	1.893	1.082	1.913	1.052	1.969	1.023	1.985	0.993	2.022	0.964	2.059	0.934	2.096	0.905	2.172	0.759	2.387	0.620	2.609
80	1.177	1.844	1.150	1.879	1.122	1.899	1.094	1.949	1.067	1.965	1.039	1.999	1.011	2.033	0.983	2.069	0.955	2.135	0.817	2.333	0.682	2.538
85	1.211	1.835	1.184	1.866	1.158	1.886	1.132	1.932	1.106	1.948	1.080	1.979	1.053	2.011	1.027	2.044	1.001	2.104	0.869	2.287	0.740	2.477
90	1.240	1.826	1.216	1.857	1.191	1.876	1.166	1.917	1.141	1.934	1.116	1.963	1.091	1.993	1.066	2.024	1.041	2.076	0.916	2.246	0.793	2.424
95	1.267	1.821	1.243	1.848	1.220	1.868	1.197	1.905	1.173	1.922	1.150	1.949	1.126	1.978	1.103	2.005	1.079	2.054	0.959	2.212	0.841	2.378
100	1.292	1.815	1.272	1.841	1.248	1.860	1.225	1.895	1.203	1.905	1.181	1.930	1.158	1.961	1.135	1.989	1.113	2.034	0.999	2.183	0.885	2.338
125	1.389	1.802	1.372	1.822	1.355	1.842	1.337	1.862	1.319	1.882	1.301	1.903	1.283	1.925	1.265	1.946	1.246	1.967	1.155	2.079	1.062	2.196
150	1.458	1.798	1.444	1.814	1.429	1.830	1.414	1.846	1.400	1.863	1.385	1.880	1.370	1.897	1.355	1.913	1.340	1.931	1.263	2.019	1.186	2.112
175	1.510	1.799	1.497	1.812	1.485	1.826	1.473	1.840	1.460	1.853	1.447	1.867	1.435	1.881	1.422	1.895	1.409	1.909	1.344	1.982	1.278	2.059
200	1.550	1.801	1.539	1.813	1.529	1.824	1.518	1.836	1.506	1.847	1.496	1.860	1.485	1.872	1.473	1.883	1.462	1.896	1.406	1.958	1.349	2.023

Tabla 10B.1 Cotas críticas $dL_{(\alpha;n,k)}$, $dU_{(\alpha;n,k)}$ del estadístico de Durbin-Watson.

$\alpha = 0.025$

n	dL (k=1)	dU (k=1)	dL (k=2)	dU (k=2)	dL (k=3)	dU (k=3)	dL (k=4)	dU (k=4)	dL (k=5)	dU (k=5)	dL (k=6)	dU (k=6)	dL (k=7)	dU (k=7)	dL (k=8)	dU (k=8)	dL (k=9)	dU (k=9)	dL (k=10)	dU (k=10)	dL (k=11)	dU (k=11)
6	0.489	1.258		1.775																		
7	0.564	1.191	0.372	1.629		2.184																
8	0.633	1.172	0.450	1.547	0.291	1.997		2.502														
9	0.690	1.164	0.520	1.493	0.365	1.878	0.234	2.300		2.749												
10	0.744	1.165	0.581	1.456	0.434	1.791	0.302	2.158	0.191	2.545		2.943										
11	0.794	1.173	0.640	1.433	0.496	1.725	0.366	2.050	0.253	2.394	0.160	2.745		3.096								
12	0.838	1.183	0.694	1.418	0.555	1.677	0.425	1.966	0.312	2.275	0.215	2.592	0.135	2.909		3.220						
13	0.879	1.196	0.742	1.409	0.609	1.642	0.484	1.900	0.369	2.178	0.269	2.468	0.185	2.758	0.116	3.044		3.320				
14	0.916	1.209	0.787	1.405	0.660	1.615	0.538	1.848	0.425	2.099	0.322	2.363	0.234	2.633	0.160	2.899	0.100	3.156		3.403		
15	0.949	1.222	0.827	1.403	0.707	1.594	0.589	1.806	0.478	2.036	0.376	2.276	0.284	2.525	0.206	2.775	0.140	3.018	0.087	3.251		3.471
16	0.980	1.236	0.864	1.403	0.748	1.578	0.636	1.773	0.528	1.982	0.427	2.204	0.334	2.433	0.252	2.666	0.182	2.897	0.124	3.119	0.077	3.331
17	1.009	1.249	0.899	1.405	0.788	1.567	0.680	1.746	0.574	1.939	0.475	2.143	0.383	2.355	0.299	2.572	0.225	2.790	0.162	3.003	0.110	3.206
18	1.035	1.262	0.930	1.407	0.825	1.558	0.720	1.723	0.619	1.902	0.521	2.091	0.430	2.289	0.345	2.491	0.269	2.695	0.202	2.898	0.145	3.095
19	1.060	1.274	0.959	1.411	0.859	1.551	0.758	1.705	0.660	1.872	0.565	2.048	0.475	2.231	0.390	2.420	0.313	2.612	0.243	2.804	0.182	2.993
20	1.083	1.286	0.987	1.415	0.890	1.546	0.794	1.691	0.699	1.845	0.606	2.010	0.517	2.182	0.433	2.359	0.356	2.540	0.285	2.720	0.221	2.900
21	1.104	1.297	1.013	1.420	0.920	1.544	0.827	1.677	0.735	1.823	0.645	1.977	0.558	2.138	0.475	2.305	0.398	2.475	0.325	2.646	0.260	2.818
22	1.124	1.309	1.036	1.424	0.948	1.540	0.857	1.668	0.769	1.804	0.681	1.948	0.597	2.100	0.515	2.257	0.438	2.418	0.366	2.581	0.299	2.744
23	1.143	1.319	1.059	1.429	0.973	1.540	0.887	1.659	0.801	1.788	0.716	1.923	0.633	2.067	0.553	2.215	0.477	2.366	0.405	2.521	0.337	2.677
24	1.161	1.329	1.080	1.434	0.997	1.539	0.914	1.651	0.831	1.774	0.748	1.902	0.668	2.037	0.589	2.177	0.514	2.321	0.442	2.468	0.375	2.616
25	1.177	1.339	1.099	1.439	1.020	1.539	0.939	1.646	0.859	1.761	0.779	1.883	0.701	2.011	0.624	2.144	0.550	2.280	0.478	2.419	0.411	2.561
26	1.193	1.348	1.118	1.445	1.041	1.538	0.963	1.641	0.886	1.751	0.808	1.867	0.732	1.987	0.657	2.114	0.584	2.243	0.513	2.375	0.447	2.511
27	1.208	1.358	1.136	1.450	1.061	1.539	0.986	1.638	0.911	1.742	0.836	1.851	0.761	1.967	0.688	2.087	0.616	2.210	0.547	2.336	0.481	2.466
28	1.223	1.367	1.152	1.455	1.080	1.540	1.008	1.635	0.935	1.733	0.862	1.838	0.789	1.948	0.718	2.063	0.648	2.180	0.579	2.302	0.514	2.424
29	1.236	1.375	1.168	1.460	1.098	1.541	1.028	1.631	0.957	1.727	0.886	1.827	0.816	1.932	0.746	2.040	0.677	2.153	0.611	2.269	0.545	2.386
30	1.249	1.383	1.183	1.465	1.116	1.543	1.047	1.630	0.979	1.720	0.910	1.816	0.841	1.916	0.773	2.020	0.705	2.128	0.640	2.239	0.576	2.352
31	1.261	1.391	1.197	1.469	1.132	1.544	1.065	1.628	0.998	1.715	0.932	1.807	0.865	1.903	0.798	2.003	0.733	2.106	0.669	2.212	0.606	2.320
32	1.272	1.398	1.211	1.474	1.148	1.547	1.083	1.627	1.018	1.711	0.953	1.799	0.888	1.891	0.823	1.987	0.759	2.085	0.696	2.187	0.634	2.291
33	1.284	1.406	1.223	1.479	1.162	1.548	1.100	1.626	1.037	1.707	0.973	1.791	0.910	1.880	0.847	1.972	0.784	2.066	0.722	2.164	0.661	2.264
34	1.295	1.413	1.236	1.483	1.176	1.550	1.116	1.626	1.054	1.703	0.992	1.785	0.931	1.870	0.869	1.957	0.807	2.049	0.747	2.143	0.687	2.240
35	1.305	1.420	1.247	1.488	1.190	1.553	1.131	1.626	1.071	1.700	1.011	1.778	0.950	1.860	0.890	1.945	0.830	2.033	0.771	2.124	0.712	2.216
36	1.315	1.426	1.259	1.493	1.202	1.555	1.145	1.626	1.087	1.697	1.028	1.773	0.970	1.852	0.910	1.934	0.852	2.019	0.794	2.106	0.736	2.195
37	1.324	1.433	1.270	1.497	1.215	1.557	1.159	1.626	1.102	1.695	1.045	1.768	0.987	1.845	0.930	1.923	0.873	2.006	0.816	2.089	0.759	2.175
38	1.333	1.439	1.280	1.502	1.227	1.560	1.172	1.626	1.117	1.693	1.061	1.764	1.005	1.837	0.949	1.914	0.893	1.993	0.837	2.074	0.781	2.157
39	1.342	1.445	1.291	1.506	1.238	1.562	1.185	1.627	1.131	1.692	1.077	1.760	1.022	1.831	0.967	1.905	0.912	1.981	0.857	2.060	0.803	2.140
40	1.350	1.451	1.300	1.510	1.249	1.564	1.197	1.628	1.145	1.690	1.091	1.756	1.038	1.825	0.984	1.897	0.930	1.970	0.877	2.046	0.824	2.125
41	1.359	1.457	1.309	1.514	1.260	1.567	1.209	1.628	1.158	1.689	1.106	1.753	1.053	1.819	1.001	1.889	0.948	1.961	0.896	2.034	0.844	2.110
42	1.366	1.462	1.319	1.518	1.270	1.569	1.220	1.629	1.170	1.688	1.119	1.750	1.068	1.815	1.017	1.882	0.966	1.951	0.914	2.023	0.863	2.095
43	1.373	1.467	1.327	1.522	1.279	1.572	1.231	1.631	1.182	1.686	1.132	1.748	1.082	1.810	1.032	1.876	0.982	1.943	0.931	2.012	0.881	2.083
44	1.381	1.472	1.335	1.525	1.289	1.574	1.242	1.632	1.194	1.686	1.145	1.746	1.096	1.806	1.047	1.870	0.997	1.935	0.948	2.002	0.899	2.071
45	1.388	1.477	1.343	1.529	1.298	1.576	1.252	1.633	1.205	1.686	1.157	1.743	1.109	1.803	1.061	1.864	1.013	1.927	0.964	1.992	0.916	2.059
46	1.395	1.482	1.351	1.533	1.306	1.579	1.262	1.634	1.215	1.685	1.169	1.741	1.122	1.799	1.075	1.859	1.027	1.920	0.980	1.984	0.932	2.049
47	1.401	1.487	1.358	1.536	1.315	1.581	1.271	1.635	1.226	1.686	1.180	1.740	1.135	1.796	1.088	1.854	1.042	1.914	0.995	1.975	0.948	2.039
48	1.408	1.491	1.366	1.540	1.323	1.584	1.280	1.636	1.236	1.689	1.191	1.738	1.146	1.793	1.101	1.850	1.055	1.908	1.009	1.968	0.964	2.029
49	1.414	1.496	1.373	1.543	1.331	1.586	1.288	1.642	1.245	1.691	1.201	1.737	1.157	1.790	1.113	1.845	1.068	1.902	1.023	1.960	0.979	2.021
50	1.420	1.500	1.380	1.546	1.339	1.589	1.297	1.649	1.255	1.695	1.212	1.732	1.168	1.780	1.125	1.828	1.081	1.878	1.037	1.930	0.993	1.982
55	1.447	1.520	1.411	1.559	1.373	1.600	1.336	1.655	1.297	1.699	1.258	1.730	1.219	1.772	1.179	1.815	1.139	1.861	1.099	1.907	1.058	1.954
60	1.471	1.538	1.438	1.574	1.403	1.610	1.369	1.662	1.334	1.703	1.298	1.729	1.262	1.767	1.225	1.807	1.189	1.848	1.152	1.890	1.115	1.932
65	1.493	1.554	1.462	1.587	1.430	1.620	1.398	1.668	1.365	1.707	1.332	1.729	1.299	1.764	1.266	1.801	1.232	1.838	1.198	1.876	1.163	1.914
70	1.511	1.568	1.482	1.598	1.453	1.630	1.423	1.674	1.394	1.711	1.363	1.730	1.332	1.763	1.301	1.796	1.269	1.830	1.238	1.865	1.206	1.900
75	1.528	1.582	1.501	1.610	1.474	1.638	1.446	1.680	1.418	1.715	1.390	1.732	1.361	1.762	1.332	1.793	1.303	1.824	1.273	1.857	1.243	1.889
80	1.544	1.594	1.519	1.620	1.493	1.647	1.467	1.686	1.440	1.718	1.414	1.734	1.387	1.762	1.360	1.790	1.332	1.820	1.305	1.849	1.277	1.879
85	1.557	1.605	1.534	1.629	1.510	1.654	1.485	1.691	1.460	1.722	1.436	1.736	1.411	1.763	1.385	1.789	1.359	1.816	1.333	1.844	1.306	1.872
90	1.570	1.615	1.548	1.638	1.525	1.662	1.502	1.696	1.479	1.726	1.455	1.739	1.431	1.764	1.407	1.788	1.383	1.814	1.358	1.840	1.334	1.866
95	1.582	1.624	1.561	1.646	1.540	1.669	1.517	1.704	1.495	1.730	1.473	1.741	1.451	1.772	1.428	1.790	1.405	1.812	1.381	1.837	1.358	1.862
100	1.593	1.633	1.572	1.653	1.552	1.675	1.532	1.711	1.511	1.733	1.490	1.744	1.468	1.781	1.447	1.796	1.425	1.811	1.403	1.834	1.381	1.847
125	1.637	1.669	1.621	1.685	1.604	1.702	1.588	1.719	1.571	1.736	1.554	1.754	1.538	1.789	1.520	1.802	1.503	1.815	1.486	1.826	1.468	1.842
150	1.669	1.696	1.656	1.710	1.642	1.723	1.629	1.738	1.615	1.752	1.601	1.766	1.587	1.797	1.572	1.808	1.558	1.819	1.544	1.828	1.530	1.841
175	1.694	1.717	1.683	1.729	1.671	1.741	1.660	1.753	1.648	1.765	1.636	1.777	1.624	1.805	1.612	1.814	1.600	1.823	1.588	1.828	1.575	1.841
200	1.714	1.734	1.705	1.745	1.694	1.755	1.684	1.766	1.674	1.776	1.664	1.787	1.653	1.813	1.642	1.820	1.632	1.827	1.621	1.830	1.611	1.841

Tabla 10B.2 Cotas críticas $dL_{(\alpha;n,k)}$, $dU_{(\alpha;n,k)}$ del estadístico de Durbin-Watson.

$\alpha = 0.025$

n	k=12 dL	k=12 dU	k=13 dL	k=13 dU	k=14 dL	k=14 dU	k=15 dL	k=15 dU	k=16 dL	k=16 dU	k=17 dL	k=17 dU	k=18 dL	k=18 dU	k=19 dL	k=19 dU	k=20 dL	k=20 dU	k=25 dL	k=25 dU	k=30 dL	k=30 dU
17	0.068	3.529																				
18	0.099	3.399	0.061	3.578																		
19	0.131	3.281	0.089	3.457	0.055	3.619																
20	0.165	3.175	0.119	3.347	0.080	3.507	0.050	3.655														
21	0.202	3.077	0.150	3.245	0.108	3.404	0.073	3.551	0.045	3.687												
22	0.238	2.987	0.184	3.151	0.138	3.307	0.098	3.454	0.067	3.589	0.041	3.714										
23	0.275	2.905	0.219	3.063	0.169	3.217	0.126	3.362	0.090	3.498	0.061	3.623	0.038	3.737								
24	0.312	2.831	0.254	2.984	0.202	3.133	0.156	3.275	0.116	3.411	0.083	3.537	0.056	3.653	0.035	3.758						
25	0.348	2.764	0.289	2.911	0.235	3.055	0.187	3.194	0.144	3.328	0.107	3.454	0.077	3.571	0.052	3.679	0.032	3.777				
26	0.383	2.703	0.324	2.844	0.269	2.983	0.219	3.119	0.173	3.250	0.134	3.375	0.100	3.494	0.071	3.602	0.048	3.702				
27	0.417	2.647	0.358	2.782	0.302	2.917	0.251	3.048	0.203	3.176	0.161	3.300	0.124	3.418	0.092	3.528	0.066	3.630				
28	0.451	2.596	0.391	2.726	0.335	2.855	0.282	2.983	0.234	3.108	0.190	3.229	0.151	3.346	0.116	3.456	0.086	3.560				
29	0.483	2.549	0.423	2.674	0.367	2.799	0.314	2.922	0.264	3.044	0.219	3.162	0.177	3.277	0.141	3.387	0.108	3.491				
30	0.514	2.506	0.455	2.626	0.398	2.747	0.345	2.866	0.295	2.984	0.248	3.100	0.205	3.212	0.167	3.321	0.132	3.425	0.022	3.844		
31	0.545	2.467	0.485	2.582	0.429	2.698	0.375	2.814	0.325	2.928	0.277	3.041	0.233	3.151	0.193	3.258	0.156	3.361	0.034	3.789		
32	0.573	2.430	0.515	2.542	0.459	2.653	0.405	2.765	0.354	2.876	0.306	2.986	0.261	3.093	0.220	3.198	0.181	3.300	0.047	3.734		
33	0.602	2.397	0.544	2.504	0.488	2.612	0.434	2.720	0.383	2.827	0.335	2.934	0.289	3.039	0.247	3.142	0.207	3.242	0.062	3.679		
34	0.628	2.366	0.572	2.470	0.516	2.574	0.463	2.678	0.412	2.782	0.363	2.886	0.317	2.988	0.273	3.089	0.233	3.187	0.079	3.624		
35	0.655	2.338	0.598	2.437	0.543	2.537	0.491	2.639	0.440	2.740	0.391	2.840	0.344	2.940	0.300	3.038	0.259	3.134	0.098	3.570	0.016	3.885
36	0.680	2.311	0.624	2.407	0.570	2.504	0.518	2.602	0.467	2.700	0.418	2.797	0.371	2.895	0.327	2.991	0.285	3.085	0.117	3.517	0.025	3.843
37	0.704	2.286	0.649	2.379	0.596	2.473	0.544	2.568	0.493	2.662	0.444	2.758	0.398	2.852	0.353	2.945	0.311	3.038	0.137	3.466	0.035	3.800
38	0.727	2.264	0.673	2.353	0.621	2.444	0.569	2.536	0.519	2.628	0.470	2.720	0.424	2.812	0.379	2.903	0.336	2.994	0.158	3.416	0.047	3.756
39	0.749	2.243	0.696	2.329	0.645	2.417	0.593	2.506	0.544	2.595	0.496	2.685	0.449	2.774	0.404	2.863	0.361	2.951	0.179	3.367	0.061	3.712
40	0.771	2.222	0.719	2.307	0.668	2.391	0.617	2.478	0.568	2.564	0.520	2.651	0.474	2.738	0.429	2.824	0.386	2.911	0.201	3.321	0.075	3.667
41	0.792	2.204	0.740	2.285	0.690	2.368	0.640	2.451	0.592	2.535	0.544	2.620	0.498	2.704	0.454	2.789	0.410	2.873	0.223	3.276	0.091	3.623
42	0.812	2.187	0.761	2.266	0.712	2.345	0.662	2.426	0.615	2.508	0.567	2.590	0.522	2.673	0.477	2.755	0.434	2.837	0.245	3.233	0.107	3.580
43	0.831	2.171	0.781	2.247	0.732	2.324	0.684	2.403	0.636	2.482	0.590	2.562	0.545	2.642	0.501	2.723	0.458	2.803	0.267	3.192	0.124	3.537
44	0.850	2.155	0.801	2.229	0.753	2.305	0.705	2.381	0.658	2.458	0.612	2.536	0.567	2.614	0.523	2.692	0.481	2.770	0.289	3.152	0.142	3.495
45	0.868	2.141	0.820	2.213	0.772	2.286	0.725	2.360	0.679	2.435	0.633	2.511	0.589	2.587	0.545	2.663	0.503	2.740	0.311	3.113	0.160	3.454
46	0.885	2.128	0.838	2.198	0.791	2.269	0.745	2.341	0.699	2.414	0.654	2.487	0.610	2.561	0.567	2.636	0.525	2.710	0.332	3.076	0.179	3.414
47	0.902	2.115	0.856	2.183	0.810	2.252	0.764	2.322	0.719	2.393	0.675	2.465	0.631	2.537	0.588	2.609	0.546	2.682	0.354	3.042	0.198	3.376
48	0.918	2.103	0.873	2.169	0.827	2.236	0.782	2.305	0.738	2.374	0.694	2.443	0.651	2.514	0.608	2.585	0.567	2.656	0.375	3.008	0.217	3.338
49	0.934	2.092	0.889	2.156	0.844	2.222	0.801	2.289	0.756	2.355	0.714	2.424	0.671	2.492	0.628	2.561	0.587	2.631	0.396	2.975	0.236	3.302
50	0.949	2.082	0.905	2.144	0.861	2.207	0.818	2.273	0.774	2.338	0.731	2.404	0.689	2.472	0.648	2.539	0.607	2.607	0.416	2.944	0.255	3.266
55	1.018	2.037	0.978	2.092	0.937	2.148	0.896	2.205	0.856	2.263	0.816	2.322	0.777	2.382	0.738	2.441	0.699	2.502	0.514	2.807	0.350	3.106
60	1.077	2.002	1.039	2.051	1.002	2.102	0.965	2.153	0.927	2.204	0.890	2.257	0.853	2.311	0.816	2.364	0.780	2.419	0.603	2.694	0.440	2.970
65	1.129	1.975	1.094	2.020	1.059	2.065	1.024	2.111	0.990	2.158	0.954	2.205	0.919	2.253	0.885	2.302	0.851	2.351	0.682	2.601	0.524	2.856
70	1.173	1.954	1.141	1.994	1.109	2.035	1.076	2.077	1.044	2.119	1.011	2.163	0.979	2.206	0.946	2.251	0.913	2.295	0.753	2.524	0.600	2.758
75	1.213	1.936	1.183	1.973	1.153	2.011	1.122	2.049	1.092	2.088	1.061	2.127	1.031	2.167	1.000	2.208	0.970	2.249	0.818	2.459	0.671	2.676
80	1.249	1.922	1.221	1.957	1.192	1.991	1.163	2.026	1.135	2.062	1.106	2.099	1.077	2.135	1.048	2.172	1.019	2.210	0.876	2.404	0.735	2.605
85	1.281	1.911	1.254	1.943	1.227	1.975	1.200	2.007	1.173	2.040	1.146	2.074	1.119	2.108	1.092	2.143	1.064	2.177	0.928	2.357	0.793	2.543
90	1.309	1.901	1.284	1.931	1.259	1.961	1.233	1.991	1.208	2.022	1.182	2.053	1.157	2.085	1.131	2.116	1.105	2.149	0.975	2.316	0.847	2.490
95	1.335	1.893	1.311	1.921	1.287	1.949	1.263	1.977	1.239	2.006	1.215	2.035	1.190	2.065	1.166	2.095	1.141	2.125	1.018	2.281	0.896	2.444
100	1.358	1.887	1.336	1.913	1.313	1.939	1.290	1.965	1.268	1.992	1.245	2.020	1.221	2.048	1.198	2.075	1.175	2.104	1.058	2.250	0.940	2.403
125	1.450	1.866	1.433	1.886	1.415	1.906	1.397	1.926	1.378	1.946	1.360	1.967	1.342	1.988	1.323	2.009	1.305	2.031	1.211	2.141	1.116	2.257
150	1.515	1.857	1.500	1.873	1.485	1.889	1.471	1.905	1.456	1.922	1.441	1.938	1.425	1.955	1.410	1.972	1.395	1.989	1.317	2.077	1.238	2.169
175	1.563	1.854	1.550	1.867	1.538	1.880	1.525	1.894	1.512	1.908	1.500	1.921	1.487	1.935	1.474	1.949	1.461	1.964	1.395	2.037	1.328	2.113
200	1.600	1.853	1.589	1.864	1.578	1.876	1.567	1.887	1.556	1.899	1.545	1.911	1.534	1.923	1.523	1.934	1.511	1.947	1.454	2.009	1.396	2.074

Tabla 10C.1 Cotas críticas $dL_{(\alpha;n,k)}$, $dU_{(\alpha;n,k)}$ del estadístico de Durbin-Watson.

$\alpha = 0.05$

n	$k{=}1$ dL	$k{=}1$ dU	$k{=}2$ dL	$k{=}2$ dU	$k{=}3$ dL	$k{=}3$ dU	$k{=}4$ dL	$k{=}4$ dU	$k{=}5$ dL	$k{=}5$ dU	$k{=}6$ dL	$k{=}6$ dU	$k{=}7$ dL	$k{=}7$ dU	$k{=}8$ dL	$k{=}8$ dU	$k{=}9$ dL	$k{=}9$ dU	$k{=}10$ dL	$k{=}10$ dU	$k{=}11$ dL	$k{=}11$ dU
6	0.611	1.401	0.467	1.896	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
7	0.699	1.356	0.559	1.777	0.367	2.286	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
8	0.763	1.332	0.629	1.699	0.455	2.128	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
9	0.824	1.320	0.697	1.641	0.525	2.017	0.295	2.588	·	·	·	·	·	·	·	·	·	·	·	·	·	·
10	0.879	1.319	0.758	1.604	0.595	1.928	0.376	2.414	0.243	2.821	·	·	·	·	·	·	·	·	·	·	·	·
11	0.927	1.324	0.812	1.579	0.658	1.864	0.444	2.283	0.316	2.645	0.203	3.005	·	·	·	·	·	·	·	·	·	·
12	0.971	1.331	0.861	1.562	0.715	1.816	0.512	2.176	0.379	2.506	0.268	2.832	0.172	3.149	·	·	·	·	·	·	·	·
13	1.010	1.340	0.905	1.550	0.767	1.779	0.575	2.094	0.444	2.389	0.328	2.692	0.230	2.985	0.147	3.266	·	·	·	·	·	·
14	1.045	1.350	0.945	1.543	0.814	1.750	0.632	2.030	0.505	2.296	0.389	2.571	0.285	2.847	0.200	3.111	0.127	3.360	·	·	·	·
15	1.077	1.361	0.982	1.539	0.857	1.728	0.685	1.977	0.562	2.220	0.447	2.472	0.343	2.727	0.251	2.979	0.175	3.216	0.111	3.438	·	·
16	1.106	1.371	1.016	1.536	0.897	1.710	0.734	1.935	0.615	2.157	0.502	2.388	0.398	2.624	0.304	2.860	0.222	3.089	0.155	3.304	0.098	3.503
17	1.133	1.382	1.046	1.535	0.933	1.696	0.779	1.901	0.664	2.104	0.554	2.317	0.451	2.536	0.357	2.757	0.272	2.974	0.198	3.184	0.138	3.378
18	1.158	1.391	1.074	1.536	0.967	1.686	0.820	1.872	0.710	2.060	0.603	2.258	0.502	2.461	0.407	2.667	0.321	2.873	0.244	3.073	0.177	3.265
19	1.180	1.401	1.100	1.537	0.997	1.676	0.859	1.848	0.752	2.022	0.649	2.206	0.549	2.396	0.456	2.589	0.369	2.783	0.290	2.974	0.220	3.159
20	1.202	1.411	1.125	1.539	1.026	1.669	0.894	1.828	0.792	1.991	0.692	2.162	0.594	2.339	0.502	2.521	0.416	2.704	0.336	2.885	0.264	3.063
21	1.221	1.420	1.147	1.541	1.054	1.665	0.927	1.812	0.829	1.964	0.732	2.124	0.637	2.290	0.546	2.461	0.461	2.634	0.380	2.806	0.307	2.976
22	1.239	1.429	1.168	1.543	1.078	1.660	0.957	1.797	0.863	1.940	0.769	2.090	0.677	2.246	0.588	2.407	0.504	2.570	0.424	2.734	0.349	2.897
23	1.256	1.437	1.188	1.546	1.101	1.656	0.986	1.786	0.895	1.920	0.804	2.061	0.715	2.208	0.628	2.360	0.545	2.515	0.466	2.670	0.391	2.826
24	1.272	1.446	1.206	1.549	1.123	1.654	1.013	1.775	0.925	1.902	0.837	2.035	0.751	2.174	0.666	2.318	0.584	2.464	0.506	2.613	0.431	2.761
25	1.287	1.453	1.223	1.552	1.143	1.652	1.038	1.767	0.953	1.886	0.868	2.013	0.784	2.144	0.702	2.280	0.621	2.419	0.544	2.560	0.470	2.703
26	1.302	1.461	1.240	1.556	1.162	1.651	1.062	1.759	0.979	1.873	0.897	1.993	0.816	2.118	0.736	2.246	0.657	2.379	0.581	2.513	0.508	2.649
27	1.316	1.469	1.255	1.560	1.180	1.650	1.084	1.753	1.004	1.861	0.925	1.975	0.845	2.093	0.767	2.216	0.690	2.342	0.616	2.470	0.544	2.600
28	1.329	1.476	1.270	1.563	1.197	1.650	1.105	1.747	1.028	1.850	0.950	1.958	0.874	2.071	0.798	2.189	0.722	2.308	0.649	2.431	0.579	2.556
29	1.341	1.483	1.284	1.567	1.214	1.650	1.124	1.742	1.050	1.841	0.975	1.944	0.901	2.052	0.827	2.164	0.753	2.278	0.682	2.396	0.612	2.514
30	1.352	1.489	1.297	1.570	1.229	1.650	1.142	1.738	1.071	1.833	0.998	1.931	0.926	2.035	0.853	2.141	0.782	2.251	0.712	2.363	0.643	2.477
31	1.363	1.496	1.309	1.574	1.244	1.650	1.160	1.735	1.090	1.825	1.020	1.920	0.949	2.018	0.879	2.120	0.810	2.226	0.741	2.333	0.674	2.443
32	1.373	1.502	1.321	1.577	1.258	1.651	1.177	1.732	1.109	1.819	1.041	1.909	0.972	2.004	0.904	2.102	0.836	2.203	0.769	2.306	0.703	2.411
33	1.383	1.508	1.333	1.581	1.271	1.652	1.193	1.730	1.127	1.813	1.061	1.900	0.994	1.991	0.928	2.085	0.861	2.182	0.796	2.280	0.731	2.382
34	1.393	1.514	1.343	1.584	1.283	1.653	1.208	1.728	1.144	1.808	1.079	1.891	1.015	1.978	0.950	2.069	0.885	2.162	0.821	2.257	0.758	2.355
35	1.402	1.519	1.354	1.587	1.296	1.654	1.222	1.726	1.160	1.803	1.098	1.884	1.034	1.968	0.971	2.054	0.908	2.144	0.845	2.236	0.783	2.330
36	1.411	1.525	1.364	1.591	1.307	1.655	1.236	1.725	1.175	1.799	1.114	1.876	1.053	1.957	0.991	2.041	0.930	2.127	0.868	2.216	0.808	2.306
37	1.419	1.530	1.373	1.594	1.318	1.656	1.249	1.723	1.190	1.795	1.131	1.870	1.071	1.948	1.011	2.029	0.951	2.112	0.891	2.198	0.831	2.285
38	1.427	1.535	1.382	1.597	1.328	1.658	1.262	1.722	1.204	1.792	1.146	1.864	1.088	1.939	1.029	2.017	0.971	2.098	0.912	2.180	0.853	2.264
39	1.435	1.540	1.391	1.600	1.338	1.659	1.274	1.722	1.217	1.789	1.161	1.859	1.104	1.932	1.047	2.007	0.990	2.085	0.932	2.164	0.875	2.246
40	1.442	1.544	1.399	1.603	1.348	1.660	1.285	1.722	1.231	1.786	1.175	1.853	1.120	1.924	1.064	1.997	1.008	2.072	0.952	2.149	0.896	2.229
41	1.450	1.549	1.407	1.606	1.357	1.662	1.296	1.721	1.243	1.784	1.189	1.849	1.135	1.918	1.080	1.988	1.025	2.061	0.971	2.136	0.916	2.212
42	1.456	1.554	1.415	1.609	1.366	1.663	1.306	1.721	1.254	1.781	1.202	1.845	1.149	1.911	1.096	1.980	1.042	2.050	0.988	2.123	0.935	2.197
43	1.463	1.558	1.423	1.612	1.375	1.665	1.316	1.720	1.266	1.779	1.215	1.841	1.163	1.906	1.111	1.972	1.058	2.040	1.006	2.111	0.953	2.182
44	1.469	1.562	1.430	1.615	1.383	1.666	1.326	1.720	1.277	1.778	1.227	1.838	1.176	1.900	1.125	1.965	1.074	2.031	1.022	2.099	0.971	2.169
45	1.475	1.566	1.437	1.617	1.391	1.668	1.336	1.720	1.287	1.776	1.239	1.835	1.189	1.895	1.139	1.958	1.089	2.022	1.039	2.088	0.988	2.156
46	1.481	1.570	1.444	1.620	1.399	1.669	1.345	1.720	1.297	1.775	1.249	1.832	1.202	1.891	1.153	1.952	1.103	2.014	1.054	2.078	1.004	2.144
47	1.487	1.574	1.450	1.623	1.406	1.671	1.353	1.721	1.308	1.774	1.261	1.829	1.213	1.887	1.165	1.945	1.117	2.006	1.069	2.069	1.020	2.133
48	1.493	1.578	1.457	1.626	1.414	1.672	1.362	1.721	1.317	1.773	1.271	1.826	1.225	1.882	1.178	1.940	1.130	1.999	1.083	2.060	1.036	2.122
49	1.498	1.581	1.462	1.628	1.421	1.674	1.370	1.721	1.326	1.772	1.281	1.824	1.235	1.879	1.190	1.935	1.143	1.992	1.097	2.052	1.050	2.112
50	1.503	1.585	1.463	1.628	1.428	1.676	1.378	1.722	1.335	1.771	1.291	1.822	1.246	1.875	1.201	1.930	1.155	1.986	1.110	2.044	1.065	2.103
55	1.527	1.601	1.490	1.641	1.452	1.681	1.414	1.724	1.374	1.768	1.334	1.813	1.294	1.861	1.253	1.909	1.212	1.959	1.171	2.010	1.129	2.062
60	1.549	1.616	1.515	1.652	1.480	1.689	1.444	1.727	1.409	1.767	1.372	1.808	1.335	1.850	1.297	1.894	1.260	1.939	1.222	1.984	1.183	2.031
65	1.567	1.630	1.536	1.662	1.504	1.696	1.471	1.731	1.438	1.768	1.404	1.805	1.370	1.843	1.336	1.883	1.301	1.923	1.266	1.964	1.231	2.006
70	1.583	1.641	1.554	1.671	1.525	1.703	1.494	1.735	1.464	1.770	1.433	1.802	1.401	1.837	1.369	1.873	1.337	1.910	1.305	1.948	1.272	1.986
75	1.598	1.652	1.571	1.680	1.543	1.709	1.515	1.739	1.487	1.771	1.458	1.801	1.428	1.834	1.399	1.867	1.369	1.901	1.339	1.935	1.308	1.971
80	1.611	1.662	1.586	1.688	1.560	1.715	1.534	1.743	1.507	1.774	1.480	1.801	1.453	1.831	1.425	1.861	1.397	1.893	1.369	1.925	1.340	1.957
85	1.624	1.671	1.600	1.696	1.575	1.721	1.550	1.747	1.525	1.776	1.500	1.801	1.474	1.829	1.448	1.857	1.422	1.887	1.395	1.916	1.369	1.946
90	1.634	1.679	1.612	1.703	1.589	1.726	1.566	1.751	1.542	1.778	1.518	1.801	1.494	1.827	1.469	1.854	1.445	1.881	1.420	1.909	1.394	1.937
95	1.644	1.687	1.623	1.709	1.602	1.732	1.579	1.754	1.557	1.780	1.535	1.801	1.512	1.827	1.489	1.852	1.465	1.877	1.442	1.903	1.418	1.929
100	1.654	1.694	1.634	1.715	1.613	1.736	1.592	1.758	1.571	1.780	1.550	1.803	1.528	1.826	1.506	1.850	1.484	1.874	1.462	1.898	1.439	1.923
125	1.692	1.724	1.676	1.741	1.659	1.758	1.643	1.774	1.626	1.792	1.609	1.810	1.592	1.828	1.574	1.846	1.557	1.864	1.539	1.883	1.522	1.902
150	1.720	1.746	1.706	1.760	1.693	1.774	1.679	1.788	1.665	1.802	1.651	1.817	1.637	1.832	1.622	1.846	1.608	1.861	1.594	1.877	1.579	1.892
175	1.741	1.764	1.730	1.776	1.718	1.788	1.706	1.800	1.694	1.812	1.682	1.824	1.670	1.837	1.658	1.849	1.646	1.862	1.634	1.875	1.621	1.888
200	1.758	1.778	1.748	1.789	1.738	1.799	1.728	1.809	1.718	1.820	1.707	1.831	1.697	1.841	1.686	1.852	1.675	1.863	1.665	1.874	1.654	1.886

Tabla 10C.2 Cotas críticas $dL_{(\alpha;n,k)}$, $dU_{(\alpha;n,k)}$ del estadístico de Durbin-Watson.

$\alpha = 0.05$

n	k = 12		k = 13		k = 14		k = 15		k = 16		k = 17		k = 18		k = 19		k = 20		k = 25		k = 30	
	dL	dU	dL	dU	dL	dU	dL	dU	dL	dU	dL	dU	dL	dU	dL	dU	dL	dU	dL	dU	dL	dU
17	0.087	3.557	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
18	0.123	3.442	0.078	3.603	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
19	0.160	3.335	0.111	3.496	0.070	3.642	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
20	0.200	3.234	0.145	3.396	0.100	3.543	0.063	3.676	.	.	.	.	.	.	.	.	.	.	.	.	.	.
21	0.240	3.141	0.182	3.300	0.132	3.448	0.091	3.583	0.058	3.706	.	.	.	.	.	.	.	.	.	.	.	.
22	0.281	3.057	0.220	3.211	0.166	3.358	0.120	3.495	0.083	3.619	0.052	3.731	.	.	.	.	.	.	.	.	.	.
23	0.322	2.979	0.259	3.128	0.202	3.272	0.153	3.409	0.110	3.535	0.076	3.650	0.048	3.753	.	.	.	.	.	.	.	.
24	0.362	2.908	0.297	3.052	0.239	3.193	0.186	3.327	0.141	3.454	0.101	3.572	0.070	3.678	0.044	3.773	.	.	.	.	.	.
25	0.401	2.844	0.336	2.983	0.275	3.119	0.221	3.251	0.172	3.376	0.130	3.494	0.094	3.604	0.065	3.702	0.041	3.790	.	.	.	.
26	0.438	2.785	0.373	2.919	0.312	3.050	0.256	3.179	0.205	3.302	0.160	3.420	0.120	3.531	0.087	3.633	0.060	3.724	.	.	.	.
27	0.475	2.730	0.409	2.860	0.348	2.987	0.291	3.112	0.238	3.233	0.191	3.349	0.149	3.460	0.112	3.563	0.081	3.658	.	.	.	.
28	0.510	2.680	0.445	2.805	0.383	2.928	0.325	3.050	0.272	3.168	0.222	3.282	0.178	3.392	0.138	3.495	0.104	3.592	.	.	.	.
29	0.544	2.635	0.479	2.754	0.417	2.874	0.359	2.992	0.305	3.107	0.254	3.219	0.208	3.327	0.166	3.430	0.129	3.528	.	.	.	.
30	0.577	2.592	0.513	2.708	0.451	2.823	0.392	2.937	0.337	3.050	0.286	3.160	0.238	3.266	0.195	3.368	0.156	3.465	0.028	3.854	.	.
31	0.608	2.554	0.545	2.665	0.483	2.776	0.425	2.887	0.370	2.996	0.318	3.103	0.269	3.208	0.224	3.309	0.183	3.406	0.042	3.804	.	.
32	0.638	2.517	0.576	2.625	0.515	2.733	0.457	2.840	0.401	2.946	0.349	3.050	0.299	3.153	0.253	3.252	0.211	3.348	0.058	3.754	.	.
33	0.668	2.484	0.605	2.588	0.545	2.692	0.488	2.796	0.432	2.899	0.379	3.000	0.329	3.101	0.282	3.198	0.239	3.293	0.076	3.703	.	.
34	0.695	2.453	0.634	2.554	0.575	2.654	0.518	2.754	0.462	2.854	0.410	2.954	0.359	3.051	0.312	3.147	0.267	3.240	0.095	3.652	.	.
35	0.722	2.425	0.662	2.522	0.604	2.619	0.547	2.716	0.492	2.813	0.439	2.909	0.388	3.005	0.340	3.099	0.295	3.190	0.115	3.601	0.021	3.892
36	0.748	2.399	0.688	2.492	0.631	2.585	0.575	2.680	0.520	2.774	0.467	2.868	0.417	2.961	0.369	3.053	0.323	3.142	0.137	3.551	0.031	3.854
37	0.772	2.374	0.714	2.464	0.657	2.555	0.602	2.646	0.548	2.738	0.495	2.829	0.445	2.919	0.396	3.009	0.351	3.097	0.159	3.503	0.043	3.815
38	0.796	2.351	0.739	2.438	0.683	2.526	0.628	2.615	0.575	2.703	0.523	2.792	0.472	2.880	0.424	2.968	0.378	3.054	0.182	3.455	0.057	3.774
39	0.819	2.329	0.762	2.413	0.707	2.499	0.653	2.585	0.601	2.671	0.549	2.757	0.499	2.843	0.451	2.929	0.404	3.013	0.206	3.409	0.072	3.733
40	0.840	2.309	0.785	2.391	0.731	2.473	0.678	2.557	0.626	2.641	0.574	2.724	0.525	2.808	0.477	2.891	0.430	2.974	0.229	3.365	0.089	3.691
41	0.861	2.290	0.807	2.369	0.754	2.449	0.701	2.530	0.650	2.612	0.599	2.694	0.550	2.775	0.502	2.857	0.456	2.937	0.253	3.322	0.106	3.650
42	0.881	2.272	0.829	2.349	0.776	2.427	0.724	2.505	0.673	2.585	0.623	2.664	0.575	2.744	0.527	2.823	0.481	2.902	0.277	3.281	0.125	3.609
43	0.901	2.256	0.849	2.330	0.797	2.406	0.747	2.482	0.696	2.559	0.647	2.637	0.599	2.714	0.551	2.792	0.506	2.869	0.300	3.241	0.144	3.569
44	0.919	2.240	0.869	2.312	0.818	2.386	0.768	2.460	0.718	2.535	0.669	2.610	0.622	2.686	0.575	2.762	0.530	2.837	0.324	3.203	0.163	3.529
45	0.938	2.225	0.888	2.296	0.838	2.367	0.788	2.439	0.739	2.512	0.691	2.586	0.644	2.660	0.598	2.733	0.553	2.807	0.347	3.166	0.183	3.490
46	0.955	2.212	0.906	2.280	0.857	2.349	0.808	2.419	0.760	2.491	0.713	2.562	0.666	2.634	0.620	2.706	0.576	2.778	0.370	3.130	0.203	3.452
47	0.972	2.198	0.923	2.265	0.875	2.333	0.827	2.401	0.780	2.470	0.733	2.540	0.688	2.610	0.642	2.680	0.598	2.751	0.392	3.096	0.224	3.415
48	0.988	2.186	0.941	2.251	0.893	2.316	0.846	2.383	0.799	2.451	0.753	2.518	0.708	2.587	0.663	2.655	0.619	2.724	0.415	3.063	0.244	3.379
49	1.003	2.174	0.957	2.237	0.910	2.301	0.864	2.367	0.818	2.432	0.773	2.499	0.728	2.565	0.684	2.632	0.640	2.699	0.437	3.032	0.264	3.344
50	1.019	2.163	0.973	2.224	0.927	2.287	0.882	2.351	0.836	2.414	0.791	2.479	0.747	2.544	0.703	2.610	0.660	2.676	0.458	3.002	0.285	3.310
55	1.087	2.116	1.045	2.170	1.003	2.225	0.961	2.281	0.919	2.338	0.877	2.396	0.836	2.454	0.795	2.512	0.754	2.572	0.560	2.867	0.385	3.155
60	1.145	2.079	1.106	2.127	1.068	2.177	1.029	2.227	0.990	2.278	0.951	2.330	0.913	2.382	0.874	2.435	0.836	2.488	0.651	2.756	0.479	3.023
65	1.195	2.049	1.160	2.094	1.124	2.138	1.088	2.183	1.052	2.230	1.016	2.276	0.980	2.323	0.944	2.371	0.908	2.419	0.732	2.664	0.566	2.910
70	1.239	2.025	1.206	2.066	1.172	2.106	1.139	2.147	1.105	2.190	1.072	2.232	1.038	2.275	1.005	2.318	0.971	2.362	0.805	2.586	0.645	2.814
75	1.277	2.006	1.246	2.043	1.215	2.080	1.184	2.118	1.153	2.156	1.121	2.195	1.090	2.235	1.058	2.275	1.027	2.315	0.870	2.521	0.717	2.732
80	1.311	1.990	1.283	2.024	1.254	2.059	1.224	2.094	1.195	2.129	1.165	2.165	1.136	2.201	1.106	2.238	1.076	2.275	0.928	2.465	0.782	2.662
85	1.342	1.977	1.315	2.009	1.288	2.040	1.260	2.073	1.232	2.105	1.205	2.139	1.177	2.172	1.149	2.206	1.121	2.241	0.980	2.418	0.841	2.600
90	1.369	1.966	1.344	1.995	1.318	2.025	1.292	2.055	1.266	2.086	1.240	2.116	1.214	2.148	1.187	2.179	1.161	2.211	1.027	2.376	0.895	2.547
95	1.394	1.956	1.370	1.984	1.345	2.011	1.321	2.040	1.296	2.068	1.272	2.097	1.247	2.126	1.222	2.156	1.197	2.186	1.070	2.340	0.944	2.500
100	1.416	1.948	1.393	1.974	1.371	2.000	1.347	2.026	1.324	2.053	1.301	2.080	1.277	2.108	1.253	2.135	1.229	2.164	1.109	2.308	0.989	2.458
125	1.504	1.922	1.486	1.941	1.467	1.961	1.449	1.981	1.431	2.002	1.412	2.022	1.394	2.043	1.375	2.064	1.356	2.085	1.260	2.195	1.163	2.309
150	1.564	1.908	1.549	1.924	1.534	1.940	1.519	1.956	1.504	1.972	1.489	1.989	1.474	2.006	1.458	2.022	1.443	2.040	1.364	2.127	1.284	2.218
175	1.609	1.901	1.596	1.914	1.583	1.927	1.571	1.941	1.558	1.955	1.545	1.968	1.532	1.982	1.519	1.996	1.506	2.010	1.439	2.083	1.371	2.159
200	1.643	1.897	1.632	1.908	1.621	1.920	1.610	1.931	1.599	1.943	1.588	1.955	1.577	1.967	1.565	1.979	1.554	1.991	1.496	2.053	1.437	2.117

Tabla 10D.1 Cotas críticas $dL_{(\alpha;n,k)}$, $dU_{(\alpha;n,k)}$ del estadístico de Durbin-Watson.

$\alpha = 0.10$

n	$k=1$ dL	$k=1$ dU	$k=2$ dL	$k=2$ dU	$k=3$ dL	$k=3$ dU	$k=4$ dL	$k=4$ dU	$k=5$ dL	$k=5$ dU	$k=6$ dL	$k=6$ dU	$k=7$ dL	$k=7$ dU	$k=8$ dL	$k=8$ dU	$k=9$ dL	$k=9$ dU	$k=10$ dL	$k=10$ dU	$k=11$ dL	$k=11$ dU
6	0.789	1.612	·	2.078	·	2.439	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
7	0.866	1.567	0.608	1.970	·	2.298	·	2.716	·	·	·	·	·	·	·	·	·	·	·	·	·	·
8	0.935	1.530	0.694	1.881	0.479	2.181	·	2.562	·	2.930	·	·	·	·	·	·	·	·	·	·	·	·
9	0.997	1.516	0.775	1.825	0.565	2.097	0.387	2.431	·	2.774	·	3.097	·	·	·	·	·	·	·	·	·	·
10	1.050	1.511	0.846	1.786	0.649	2.033	0.468	2.329	0.318	2.637	·	2.945	·	3.229	·	·	·	·	·	·	·	·
11	1.096	1.510	0.908	1.757	0.724	1.983	0.550	2.250	0.393	2.528	0.265	2.809	·	3.084	·	3.335	·	·	·	·	·	·
12	1.137	1.513	0.963	1.737	0.789	1.944	0.624	2.185	0.471	2.439	0.335	2.696	0.225	2.953	·	3.199	·	3.421	·	·	·	·
13	1.172	1.516	1.011	1.721	0.849	1.912	0.691	2.132	0.542	2.364	0.407	2.602	0.288	2.840	0.193	3.073	·	3.294	·	3.491	·	·
14	1.205	1.522	1.053	1.710	0.902	1.887	0.752	2.088	0.608	2.301	0.475	2.521	0.355	2.743	0.250	2.962	0.167	3.174	·	3.374	·	3.550
15	1.234	1.528	1.093	1.702	0.949	1.867	0.807	2.052	0.669	2.248	0.539	2.452	0.419	2.659	0.312	2.865	0.219	3.067	0.146	3.260	·	3.441
16	1.260	1.534	1.127	1.696	0.992	1.850	0.857	2.022	0.725	2.204	0.599	2.393	0.480	2.586	0.372	2.780	0.276	2.972	0.194	3.157	0.129	3.334
17	1.284	1.541	1.159	1.691	1.031	1.836	0.903	1.996	0.776	2.165	0.654	2.341	0.538	2.522	0.430	2.705	0.332	2.887	0.246	3.065	0.172	3.236
18	1.306	1.547	1.188	1.688	1.066	1.824	0.945	1.974	0.824	2.132	0.706	2.297	0.593	2.466	0.486	2.639	0.388	2.811	0.299	2.981	0.221	3.147
19	1.326	1.554	1.214	1.686	1.099	1.815	0.983	1.955	0.867	2.103	0.753	2.258	0.644	2.417	0.539	2.580	0.441	2.744	0.351	2.906	0.270	3.065
20	1.345	1.560	1.238	1.685	1.128	1.808	1.018	1.938	0.907	2.078	0.798	2.224	0.691	2.374	0.589	2.527	0.491	2.682	0.401	2.838	0.319	2.990
21	1.362	1.566	1.261	1.685	1.156	1.800	1.050	1.924	0.944	2.055	0.839	2.193	0.736	2.335	0.636	2.480	0.540	2.628	0.450	2.776	0.367	2.922
22	1.378	1.573	1.281	1.685	1.182	1.795	1.080	1.912	0.978	2.036	0.877	2.166	0.777	2.300	0.680	2.438	0.586	2.578	0.497	2.720	0.413	2.860
23	1.393	1.578	1.300	1.686	1.205	1.790	1.108	1.901	1.010	2.019	0.913	2.142	0.816	2.270	0.721	2.400	0.630	2.534	0.542	2.669	0.459	2.803
24	1.406	1.584	1.318	1.687	1.227	1.786	1.134	1.892	1.040	2.003	0.946	2.121	0.852	2.242	0.760	2.366	0.671	2.494	0.585	2.622	0.503	2.751
25	1.420	1.589	1.335	1.688	1.247	1.783	1.158	1.884	1.067	1.990	0.977	2.101	0.886	2.216	0.797	2.335	0.710	2.457	0.626	2.579	0.544	2.704
26	1.432	1.595	1.350	1.690	1.266	1.780	1.180	1.876	1.093	1.978	1.006	2.084	0.918	2.194	0.832	2.307	0.747	2.423	0.664	2.541	0.584	2.660
27	1.444	1.600	1.365	1.691	1.284	1.778	1.201	1.870	1.117	1.966	1.033	2.068	0.948	2.173	0.864	2.282	0.782	2.392	0.701	2.506	0.622	2.619
28	1.455	1.606	1.379	1.693	1.300	1.776	1.221	1.864	1.140	1.957	1.058	2.054	0.977	2.154	0.895	2.258	0.814	2.364	0.735	2.473	0.659	2.582
29	1.465	1.610	1.392	1.694	1.316	1.774	1.239	1.859	1.161	1.948	1.082	2.041	1.003	2.137	0.924	2.237	0.846	2.339	0.769	2.443	0.693	2.548
30	1.475	1.615	1.404	1.696	1.331	1.773	1.257	1.854	1.181	1.940	1.105	2.029	1.028	2.121	0.951	2.217	0.875	2.315	0.800	2.415	0.726	2.516
31	1.484	1.619	1.415	1.698	1.345	1.772	1.273	1.850	1.200	1.932	1.126	2.018	1.052	2.107	0.977	2.199	0.903	2.293	0.830	2.389	0.757	2.487
32	1.492	1.624	1.426	1.700	1.359	1.771	1.289	1.846	1.218	1.926	1.147	2.008	1.074	2.094	1.002	2.182	0.930	2.273	0.858	2.365	0.787	2.460
33	1.501	1.628	1.437	1.701	1.371	1.770	1.304	1.843	1.235	1.920	1.166	1.999	1.095	2.082	1.025	2.166	0.955	2.254	0.885	2.343	0.816	2.434
34	1.509	1.632	1.447	1.703	1.383	1.770	1.318	1.840	1.251	1.914	1.184	1.991	1.115	2.070	1.047	2.152	0.979	2.237	0.911	2.323	0.843	2.411
35	1.517	1.636	1.456	1.705	1.395	1.770	1.331	1.838	1.267	1.909	1.201	1.983	1.135	2.060	1.068	2.139	1.002	2.220	0.935	2.304	0.869	2.388
36	1.524	1.640	1.465	1.707	1.405	1.770	1.344	1.835	1.281	1.904	1.217	1.976	1.153	2.050	1.088	2.127	1.023	2.205	0.958	2.286	0.894	2.368
37	1.531	1.644	1.474	1.709	1.416	1.770	1.356	1.833	1.295	1.900	1.233	1.969	1.170	2.041	1.107	2.115	1.044	2.191	0.981	2.269	0.917	2.348
38	1.538	1.648	1.482	1.711	1.426	1.771	1.367	1.832	1.308	1.896	1.248	1.963	1.187	2.033	1.125	2.104	1.064	2.178	1.002	2.253	0.940	2.330
39	1.544	1.651	1.491	1.712	1.435	1.771	1.378	1.830	1.320	1.893	1.262	1.958	1.203	2.025	1.143	2.094	1.082	2.166	1.022	2.239	0.962	2.314
40	1.551	1.654	1.498	1.714	1.444	1.772	1.389	1.828	1.333	1.889	1.275	1.952	1.218	2.018	1.159	2.085	1.100	2.155	1.042	2.225	0.983	2.297
41	1.557	1.658	1.505	1.716	1.453	1.772	1.399	1.827	1.344	1.886	1.288	1.948	1.232	2.011	1.175	2.076	1.118	2.144	1.060	2.212	1.003	2.282
42	1.562	1.661	1.512	1.718	1.461	1.773	1.408	1.826	1.355	1.883	1.301	1.943	1.246	2.004	1.190	2.068	1.134	2.133	1.078	2.200	1.022	2.268
43	1.568	1.664	1.519	1.719	1.469	1.774	1.418	1.825	1.365	1.880	1.313	1.939	1.259	1.999	1.205	2.060	1.150	2.124	1.095	2.189	1.040	2.255
44	1.573	1.667	1.526	1.721	1.477	1.775	1.427	1.824	1.376	1.878	1.324	1.935	1.271	1.993	1.218	2.053	1.165	2.115	1.111	2.178	1.057	2.242
45	1.578	1.670	1.532	1.721	1.484	1.776	1.435	1.823	1.385	1.876	1.335	1.931	1.284	1.988	1.232	2.046	1.180	2.106	1.127	2.168	1.074	2.230
46	1.583	1.673	1.538	1.723	1.491	1.777	1.444	1.822	1.395	1.874	1.345	1.928	1.296	1.983	1.245	2.040	1.193	2.098	1.142	2.158	1.091	2.219
47	1.588	1.676	1.544	1.725	1.498	1.778	1.451	1.821	1.404	1.872	1.356	1.924	1.307	1.978	1.257	2.034	1.207	2.091	1.157	2.149	1.106	2.208
48	1.593	1.679	1.549	1.726	1.504	1.779	1.459	1.820	1.412	1.870	1.365	1.921	1.317	1.974	1.269	2.028	1.220	2.083	1.170	2.140	1.121	2.198
49	1.597	1.681	1.555	1.728	1.511	1.780	1.466	1.819	1.421	1.869	1.374	1.920	1.328	1.971	1.280	2.024	1.232	2.078	1.184	2.135	1.136	2.194
50	1.602	1.684	1.560	1.729	1.517	1.781	1.473	1.819	1.429	1.868	1.384	1.919	1.338	1.968	1.291	2.020	1.244	2.073	1.197	2.130	1.149	2.190
55	1.622	1.697	1.584	1.736	1.545	1.781	1.505	1.819	1.465	1.863	1.424	1.909	1.383	1.956	1.341	2.003	1.298	2.053	1.255	2.103	1.212	2.154
60	1.639	1.708	1.604	1.743	1.569	1.784	1.533	1.820	1.496	1.859	1.459	1.899	1.421	1.942	1.382	1.984	1.344	2.029	1.305	2.074	1.265	2.120
65	1.654	1.717	1.622	1.750	1.590	1.788	1.556	1.821	1.523	1.855	1.488	1.893	1.454	1.931	1.419	1.970	1.383	2.010	1.347	2.051	1.310	2.093
70	1.668	1.726	1.638	1.756	1.608	1.791	1.577	1.822	1.546	1.853	1.514	1.887	1.482	1.922	1.450	1.958	1.417	1.995	1.384	2.032	1.350	2.070
75	1.680	1.734	1.652	1.762	1.624	1.795	1.595	1.823	1.567	1.852	1.537	1.884	1.507	1.916	1.477	1.949	1.446	1.982	1.416	2.017	1.384	2.052
80	1.690	1.741	1.665	1.768	1.639	1.798	1.612	1.824	1.585	1.851	1.557	1.881	1.529	1.910	1.501	1.941	1.473	1.972	1.444	2.004	1.415	2.036
85	1.700	1.748	1.676	1.773	1.651	1.802	1.626	1.826	1.601	1.851	1.575	1.878	1.549	1.906	1.523	1.935	1.496	1.964	1.469	1.993	1.441	2.023
90	1.709	1.754	1.687	1.778	1.663	1.805	1.640	1.828	1.616	1.851	1.591	1.877	1.567	1.903	1.542	1.929	1.517	1.957	1.492	1.984	1.466	2.012
95	1.717	1.760	1.696	1.782	1.674	1.808	1.652	1.830	1.629	1.851	1.606	1.876	1.583	1.900	1.560	1.925	1.536	1.950	1.512	1.976	1.488	2.002
100	1.725	1.766	1.705	1.787	1.684	1.810	1.663	1.830	1.641	1.852	1.620	1.875	1.598	1.898	1.575	1.921	1.553	1.945	1.530	1.970	1.507	1.994
125	1.756	1.788	1.739	1.805	1.723	1.822	1.706	1.839	1.689	1.856	1.672	1.876	1.655	1.890	1.637	1.910	1.620	1.929	1.602	1.947	1.584	1.966
150	1.778	1.805	1.765	1.819	1.751	1.833	1.737	1.847	1.723	1.861	1.709	1.878	1.695	1.890	1.680	1.905	1.666	1.920	1.651	1.936	1.636	1.951
175	1.795	1.819	1.784	1.830	1.772	1.842	1.760	1.854	1.748	1.866	1.736	1.878	1.724	1.891	1.712	1.903	1.700	1.916	1.687	1.929	1.675	1.942
200	1.809	1.829	1.799	1.840	1.789	1.850	1.779	1.860	1.768	1.871	1.758	1.882	1.747	1.892	1.737	1.903	1.726	1.914	1.715	1.925	1.704	1.937

Tabla 10D.2 Cotas críticas $dL_{(\alpha;n,k)}$, $dU_{(\alpha;n,k)}$ del estadístico de Durbin-Watson.

$\alpha = 0.10$

| n	k=12 dL	k=12 dU	k=13 dL	k=13 dU	k=14 dL	k=14 dU	k=15 dL	k=15 dU	k=16 dL	k=16 dU	k=17 dL	k=17 dU	k=18 dL	k=18 dU	k=19 dL	k=19 dU	k=20 dL	k=20 dU	k=25 dL	k=25 dU	k=30 dL	k=30 dU
17	0.114	3.599																				
18	0.154	3.498	0.102	3.641																		
19	0.199	3.398	0.139	3.547	0.092	3.677																
20	0.245	3.304	0.181	3.453	0.126	3.589	0.083	3.707														
21	0.291	3.219	0.223	3.364	0.164	3.501	0.114	3.626	0.076	3.734												
22	0.337	3.139	0.266	3.282	0.204	3.417	0.150	3.543	0.104	3.658	0.069	3.757										
23	0.381	3.066	0.310	3.205	0.245	3.338	0.187	3.464	0.138	3.580	0.096	3.686	0.063	3.777								
24	0.425	2.999	0.352	3.134	0.286	3.264	0.226	3.388	0.173	3.505	0.127	3.613	0.088	3.711	0.058	3.795						
25	0.467	2.936	0.394	3.068	0.327	3.195	0.265	3.317	0.209	3.433	0.159	3.542	0.117	3.642	0.081	3.733	0.053	3.811				
26	0.507	2.880	0.435	3.006	0.366	3.130	0.303	3.250	0.245	3.365	0.194	3.473	0.148	3.575	0.108	3.668	0.075	3.752				
27	0.546	2.827	0.474	2.949	0.406	3.070	0.342	3.187	0.283	3.300	0.229	3.408	0.180	3.509	0.137	3.604	0.101	3.692				
28	0.584	2.779	0.512	2.897	0.444	3.013	0.379	3.127	0.319	3.238	0.264	3.345	0.213	3.446	0.168	3.542	0.128	3.631				
29	0.620	2.734	0.549	2.848	0.481	2.961	0.416	3.072	0.356	3.180	0.299	3.285	0.247	3.386	0.199	3.482	0.157	3.571				
30	0.654	2.692	0.584	2.802	0.517	2.912	0.452	3.020	0.391	3.126	0.334	3.229	0.280	3.328	0.231	3.423	0.187	3.514	0.037	3.868		
31	0.687	2.654	0.618	2.761	0.551	2.866	0.487	2.971	0.426	3.075	0.368	3.175	0.314	3.273	0.264	3.367	0.217	3.457	0.053	3.824		
32	0.718	2.618	0.650	2.721	0.584	2.824	0.521	2.926	0.460	3.026	0.402	3.125	0.347	3.221	0.296	3.314	0.248	3.404	0.072	3.778		
33	0.748	2.586	0.681	2.685	0.616	2.784	0.553	2.883	0.493	2.981	0.435	3.077	0.380	3.171	0.328	3.263	0.279	3.352	0.093	3.731		
34	0.776	2.555	0.711	2.651	0.647	2.747	0.585	2.843	0.525	2.938	0.467	3.032	0.412	3.124	0.359	3.215	0.310	3.302	0.115	3.684		
35	0.804	2.526	0.740	2.619	0.677	2.712	0.615	2.805	0.556	2.898	0.498	2.989	0.443	3.079	0.390	3.168	0.340	3.254	0.138	3.637	0.027	3.902
36	0.830	2.499	0.767	2.589	0.705	2.679	0.645	2.770	0.586	2.860	0.528	2.949	0.473	3.037	0.421	3.124	0.370	3.209	0.163	3.591	0.039	3.869
37	0.855	2.474	0.793	2.561	0.732	2.649	0.673	2.737	0.615	2.824	0.558	2.911	0.503	2.997	0.450	3.082	0.400	3.166	0.188	3.546	0.054	3.833
38	0.879	2.451	0.818	2.535	0.759	2.620	0.700	2.705	0.642	2.791	0.586	2.875	0.532	2.959	0.480	3.043	0.429	3.125	0.213	3.501	0.070	3.796
39	0.902	2.429	0.842	2.511	0.784	2.593	0.726	2.676	0.670	2.759	0.614	2.841	0.560	2.923	0.508	3.005	0.457	3.085	0.239	3.458	0.088	3.758
40	0.924	2.409	0.866	2.488	0.808	2.568	0.751	2.648	0.695	2.729	0.641	2.809	0.587	2.889	0.535	2.968	0.485	3.047	0.265	3.416	0.107	3.719
41	0.945	2.389	0.888	2.466	0.832	2.544	0.776	2.622	0.721	2.700	0.667	2.779	0.614	2.857	0.562	2.935	0.512	3.012	0.290	3.375	0.126	3.681
42	0.965	2.371	0.909	2.446	0.854	2.521	0.799	2.597	0.745	2.673	0.691	2.750	0.639	2.826	0.588	2.902	0.539	2.977	0.316	3.336	0.147	3.643
43	0.985	2.354	0.930	2.426	0.875	2.500	0.821	2.574	0.768	2.648	0.716	2.722	0.664	2.797	0.614	2.871	0.564	2.945	0.341	3.298	0.168	3.605
44	1.003	2.337	0.950	2.408	0.896	2.479	0.843	2.551	0.791	2.624	0.739	2.696	0.688	2.769	0.638	2.842	0.589	2.914	0.367	3.261	0.190	3.568
45	1.021	2.322	0.969	2.391	0.916	2.460	0.864	2.530	0.812	2.601	0.761	2.672	0.711	2.743	0.662	2.814	0.614	2.884	0.391	3.226	0.211	3.531
46	1.039	2.308	0.987	2.375	0.936	2.442	0.884	2.510	0.834	2.579	0.783	2.648	0.734	2.718	0.685	2.787	0.637	2.856	0.416	3.192	0.233	3.496
47	1.055	2.294	1.005	2.359	0.954	2.425	0.904	2.491	0.854	2.558	0.804	2.626	0.756	2.694	0.707	2.761	0.660	2.829	0.440	3.159	0.255	3.460
48	1.071	2.281	1.022	2.345	0.972	2.408	0.922	2.473	0.873	2.539	0.825	2.605	0.777	2.671	0.729	2.737	0.682	2.803	0.463	3.127	0.278	3.426
49	1.087	2.269	1.038	2.331	0.989	2.393	0.941	2.457	0.892	2.520	0.845	2.585	0.797	2.649	0.750	2.714	0.704	2.778	0.486	3.097	0.300	3.393
50	1.102	2.257	1.054	2.317	1.006	2.378	0.958	2.440	0.911	2.502	0.863	2.565	0.817	2.628	0.771	2.691	0.725	2.755	0.509	3.068	0.322	3.361
55	1.169	2.207	1.125	2.261	1.081	2.314	1.037	2.369	0.994	2.425	0.950	2.481	0.907	2.537	0.863	2.594	0.821	2.651	0.615	2.936	0.428	3.211
60	1.225	2.167	1.185	2.215	1.145	2.264	1.105	2.313	1.064	2.363	1.024	2.413	0.984	2.464	0.944	2.515	0.904	2.567	0.709	2.827	0.527	3.083
65	1.274	2.135	1.237	2.179	1.200	2.222	1.163	2.267	1.125	2.312	1.088	2.358	1.050	2.404	1.013	2.450	0.976	2.497	0.792	2.735	0.617	2.973
70	1.316	2.109	1.282	2.148	1.247	2.188	1.213	2.229	1.178	2.270	1.144	2.312	1.109	2.354	1.074	2.397	1.039	2.440	0.866	2.658	0.698	2.879
75	1.353	2.087	1.321	2.123	1.289	2.160	1.257	2.198	1.225	2.235	1.192	2.274	1.160	2.312	1.127	2.351	1.094	2.391	0.931	2.592	0.772	2.798
80	1.385	2.069	1.356	2.102	1.326	2.137	1.296	2.171	1.266	2.206	1.235	2.241	1.205	2.277	1.174	2.313	1.143	2.349	0.990	2.536	0.838	2.727
85	1.414	2.054	1.386	2.085	1.358	2.116	1.330	2.148	1.302	2.180	1.273	2.213	1.245	2.246	1.216	2.280	1.187	2.314	1.042	2.487	0.898	2.666
90	1.440	2.041	1.414	2.069	1.388	2.099	1.361	2.129	1.334	2.159	1.307	2.189	1.281	2.220	1.253	2.252	1.226	2.283	1.089	2.445	0.952	2.612
95	1.463	2.029	1.438	2.056	1.414	2.084	1.389	2.112	1.363	2.140	1.338	2.168	1.313	2.197	1.287	2.227	1.261	2.256	1.131	2.408	1.001	2.564
100	1.484	2.019	1.461	2.045	1.438	2.071	1.414	2.097	1.390	2.123	1.366	2.150	1.342	2.177	1.318	2.205	1.293	2.232	1.170	2.375	1.046	2.522
125	1.566	1.986	1.547	2.005	1.529	2.025	1.510	2.045	1.492	2.065	1.473	2.086	1.454	2.106	1.435	2.127	1.415	2.148	1.318	2.257	1.219	2.369
150	1.621	1.967	1.606	1.982	1.591	1.998	1.576	2.014	1.561	2.031	1.545	2.047	1.530	2.064	1.514	2.081	1.498	2.098	1.418	2.184	1.337	2.275
175	1.662	1.955	1.649	1.968	1.637	1.982	1.624	1.995	1.611	2.009	1.598	2.022	1.585	2.036	1.571	2.050	1.558	2.064	1.490	2.137	1.421	2.211
200	1.693	1.948	1.682	1.959	1.671	1.971	1.660	1.982	1.649	1.994	1.637	2.005	1.626	2.018	1.615	2.029	1.603	2.041	1.545	2.103	1.485	2.167

11. Distribución del estadístico U de Corridas (Wald-Wolfowitz)

U = número de corridas.

$$P(U = u) = \begin{cases} 2\binom{m-1}{k-1}\binom{n-1}{k-1}/\binom{m+n}{m} & \text{si } u = 2k \\[2ex] \left(\binom{m-1}{k-1}\binom{n-1}{k-2} + \binom{m-1}{k-2}\binom{n-1}{k-1}\right)/\binom{m+n}{m} & \text{si } u = 2k-1 \end{cases}$$

donde m y n son el total de ceros y unos en la secuencia, respectivamente.
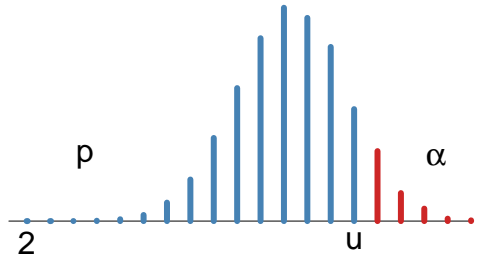
$$\mathrm{p} = P(U \leq u) = \sum_{k=1}^{u} P(U = k) = 1 - \alpha$$

Tabla 11A. Probabilidades acumuladas p de la distribución de corridas.

(m, n)	2	3	4	5	6	7	8	9	10	11
(2, 2)	0.333	0.667	1.000	.	.	.	.	.	.	.
(2, 3)	0.200	0.500	0.900	1.000	.	.	.	.	.	.
(2, 4)	0.133	0.400	0.800	1.000	.	.	.	.	.	.
(2, 5)	0.095	0.333	0.714	1.000	.	.	.	.	.	.
(2, 6)	0.071	0.286	0.643	1.000	.	.	.	.	.	.
(2, 7)	0.056	0.250	0.583	1.000	.	.	.	.	.	.
(2, 8)	0.044	0.222	0.533	1.000	.	.	.	.	.	.
(2, 9)	0.036	0.200	0.491	1.000	.	.	.	.	.	.
(2, 10)	0.030	0.182	0.455	1.000	.	.	.	.	.	.
(2, 11)	0.026	0.167	0.423	1.000	.	.	.	.	.	.
(2, 12)	0.022	0.154	0.396	1.000	.	.	.	.	.	.
(2, 13)	0.019	0.143	0.371	1.000	.	.	.	.	.	.
(2, 14)	0.017	0.133	0.350	1.000	.	.	.	.	.	.
(2, 15)	0.015	0.125	0.331	1.000	.	.	.	.	.	.
(2, 16)	0.013	0.118	0.314	1.000	.	.	.	.	.	.
(2, 17)	0.012	0.111	0.298	1.000	.	.	.	.	.	.
(2, 18)	0.011	0.105	0.284	1.000	.	.	.	.	.	.
(2, 19)	0.010	0.100	0.271	1.000	.	.	.	.	.	.
(2, 20)	0.009	0.095	0.260	1.000	.	.	.	.	.	.
(3, 3)	0.100	0.300	0.700	0.900	1.000	.	.	.	.	.
(3, 4)	0.057	0.200	0.543	0.800	0.971	1.000	.	.	.	.
(3, 5)	0.036	0.143	0.429	0.714	0.929	1.000	.	.	.	.
(3, 6)	0.024	0.107	0.345	0.643	0.881	1.000	.	.	.	.
(3, 7)	0.017	0.083	0.283	0.583	0.833	1.000	.	.	.	.
(3, 8)	0.012	0.067	0.236	0.533	0.788	1.000	.	.	.	.
(3, 9)	0.009	0.055	0.200	0.491	0.745	1.000	.	.	.	.
(3, 10)	0.007	0.045	0.171	0.455	0.706	1.000	.	.	.	.
(3, 11)	0.005	0.038	0.148	0.423	0.670	1.000	.	.	.	.
(3, 12)	0.004	0.033	0.130	0.396	0.637	1.000	.	.	.	.
(3, 13)	0.004	0.029	0.114	0.371	0.607	1.000	.	.	.	.
(3, 14)	0.003	0.025	0.101	0.350	0.579	1.000	.	.	.	.
(3, 15)	0.002	0.022	0.091	0.331	0.554	1.000	.	.	.	.
(3, 16)	0.002	0.020	0.082	0.314	0.530	1.000	.	.	.	.
(3, 17)	0.002	0.018	0.074	0.298	0.509	1.000	.	.	.	.
(3, 18)	0.002	0.016	0.067	0.284	0.489	1.000	.	.	.	.
(3, 19)	0.001	0.014	0.061	0.271	0.470	1.000	.	.	.	.
(3, 20)	0.001	0.013	0.056	0.260	0.453	1.000	.	.	.	.
(4, 4)	0.029	0.114	0.371	0.629	0.886	0.971	1.000	.	.	.
(4, 5)	0.016	0.071	0.262	0.500	0.786	0.929	0.992	1.000	.	.
(4, 6)	0.010	0.048	0.190	0.405	0.690	0.881	0.976	1.000	.	.
(4, 7)	0.006	0.033	0.142	0.333	0.606	0.833	0.955	1.000	.	.
(4, 8)	0.004	0.024	0.109	0.279	0.533	0.788	0.929	1.000	.	.
(4, 9)	0.003	0.018	0.085	0.236	0.471	0.745	0.902	1.000	.	.
(4, 10)	0.002	0.014	0.068	0.203	0.419	0.706	0.874	1.000	.	.
(4, 11)	0.001	0.011	0.055	0.176	0.374	0.670	0.846	1.000	.	.
(4, 12)	0.001	0.009	0.045	0.154	0.335	0.637	0.819	1.000	.	.
(4, 13)	0.001	0.007	0.037	0.136	0.302	0.607	0.792	1.000	.	.
(4, 14)	0.001	0.006	0.031	0.121	0.274	0.579	0.766	1.000	.	.
(4, 15)	0.001	0.005	0.027	0.108	0.249	0.554	0.742	1.000	.	.
(4, 16)	0.000	0.004	0.023	0.097	0.227	0.530	0.718	1.000	.	.
(4, 17)	0.000	0.004	0.020	0.088	0.208	0.509	0.696	1.000	.	.
(4, 18)	0.000	0.003	0.017	0.080	0.191	0.489	0.675	1.000	.	.
(4, 19)	0.000	0.003	0.015	0.073	0.176	0.470	0.654	1.000	.	.
(4, 20)	0.000	0.002	0.013	0.067	0.163	0.453	0.635	1.000	.	.
(5, 5)	0.008	0.040	0.167	0.357	0.643	0.833	0.960	0.992	1.000	.
(5, 6)	0.004	0.024	0.110	0.262	0.522	0.738	0.911	0.976	0.998	1.000
(5, 7)	0.003	0.015	0.076	0.197	0.424	0.652	0.854	0.955	0.992	1.000
(5, 8)	0.002	0.010	0.054	0.152	0.347	0.576	0.793	0.929	0.984	1.000
(5, 9)	0.001	0.007	0.039	0.119	0.287	0.510	0.734	0.902	0.972	1.000
(5, 10)	0.001	0.005	0.029	0.095	0.239	0.455	0.678	0.874	0.958	1.000
(5, 11)	0.000	0.004	0.022	0.077	0.201	0.407	0.626	0.846	0.942	1.000
(5, 12)	0.000	0.003	0.017	0.063	0.170	0.365	0.579	0.819	0.925	1.000
(5, 13)	0.000	0.002	0.013	0.053	0.145	0.330	0.535	0.792	0.908	1.000
(5, 14)	0.000	0.002	0.011	0.044	0.125	0.299	0.496	0.766	0.889	1.000
(5, 15)	0.000	0.001	0.009	0.037	0.108	0.272	0.460	0.742	0.871	1.000
(5, 16)	0.000	0.001	0.007	0.032	0.094	0.249	0.428	0.718	0.852	1.000
(5, 17)	0.000	0.001	0.006	0.028	0.082	0.228	0.398	0.696	0.834	1.000
(5, 18)	0.000	0.001	0.005	0.024	0.072	0.210	0.372	0.675	0.816	1.000
(5, 19)	0.000	0.001	0.004	0.021	0.064	0.194	0.347	0.654	0.798	1.000
(5, 20)	0.000	0.000	0.003	0.018	0.057	0.179	0.325	0.635	0.781	1.000

Tabla 11B. Probabilidades acumuladas p de la distribución de corridas.

Variable de columna: u

(m, n)	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
(6, 6)	0.002	0.013	0.067	0.175	0.392	0.608	0.825	0.933	0.987	0.998	1.000	1.000								
(6, 7)	0.001	0.008	0.043	0.121	0.296	0.500	0.733	0.879	0.966	0.992	0.999	1.000								
(6, 8)	0.000	0.005	0.028	0.086	0.226	0.413	0.646	0.821	0.937	0.984	0.998	1.000								
(6, 9)	0.000	0.003	0.019	0.063	0.175	0.343	0.566	0.762	0.902	0.972	0.994	1.000								
(6, 10)	0.000	0.002	0.013	0.047	0.137	0.287	0.497	0.706	0.864	0.958	0.990	1.000								
(6, 11)	0.000	0.001	0.009	0.036	0.108	0.242	0.436	0.654	0.824	0.942	0.983	1.000								
(6, 12)	0.000	0.001	0.007	0.028	0.087	0.205	0.383	0.605	0.783	0.925	0.975	1.000								
(6, 13)	0.000	0.001	0.005	0.022	0.070	0.176	0.338	0.561	0.743	0.908	0.966	1.000								
(6, 14)	0.000	0.001	0.004	0.017	0.058	0.151	0.299	0.520	0.705	0.889	0.956	1.000								
(6, 15)	0.000	0.000	0.003	0.014	0.047	0.131	0.265	0.483	0.668	0.871	0.945	1.000								
(6, 16)	0.000	0.000	0.002	0.011	0.039	0.115	0.237	0.450	0.633	0.852	0.933	1.000								
(6, 17)	0.000	0.000	0.002	0.009	0.033	0.100	0.211	0.419	0.600	0.834	0.921	1.000								
(6, 18)	0.000	0.000	0.001	0.008	0.028	0.089	0.190	0.392	0.569	0.816	0.908	1.000								
(6, 19)	0.000	0.000	0.001	0.006	0.024	0.078	0.171	0.366	0.539	0.798	0.895	1.000								
(6, 20)	0.000	0.000	0.001	0.005	0.020	0.070	0.154	0.343	0.512	0.781	0.882	1.000								
(7, 7)	0.001	0.004	0.025	0.078	0.209	0.383	0.617	0.791	0.922	0.975	0.996	0.999	1.000							
(7, 8)	0.000	0.002	0.015	0.051	0.149	0.296	0.514	0.704	0.867	0.949	0.988	0.998	0.999	1.000						
(7, 9)	0.000	0.001	0.010	0.035	0.108	0.231	0.427	0.622	0.806	0.916	0.975	0.994	0.999	1.000						
(7, 10)	0.000	0.001	0.006	0.024	0.080	0.182	0.355	0.549	0.743	0.879	0.957	0.990	0.998	1.000						
(7, 11)	0.000	0.001	0.004	0.018	0.060	0.145	0.296	0.484	0.682	0.840	0.936	0.983	0.996	1.000						
(7, 12)	0.000	0.000	0.003	0.013	0.046	0.117	0.247	0.428	0.624	0.801	0.911	0.975	0.993	1.000						
(7, 13)	0.000	0.000	0.002	0.010	0.035	0.095	0.208	0.378	0.570	0.762	0.884	0.966	0.990	1.000						
(7, 14)	0.000	0.000	0.002	0.007	0.027	0.078	0.176	0.336	0.520	0.723	0.856	0.956	0.985	1.000						
(7, 15)	0.000	0.000	0.001	0.006	0.022	0.064	0.150	0.299	0.475	0.686	0.827	0.945	0.980	1.000						
(7, 16)	0.000	0.000	0.001	0.004	0.017	0.054	0.128	0.267	0.434	0.651	0.798	0.933	0.974	1.000						
(7, 17)	0.000	0.000	0.001	0.003	0.014	0.045	0.110	0.239	0.397	0.618	0.769	0.921	0.967	1.000						
(7, 18)	0.000	0.000	0.000	0.003	0.011	0.038	0.095	0.215	0.363	0.586	0.741	0.908	0.960	1.000						
(7, 19)	0.000	0.000	0.000	0.002	0.009	0.032	0.082	0.194	0.333	0.557	0.713	0.895	0.952	1.000						
(7, 20)	0.000	0.000	0.000	0.002	0.008	0.028	0.071	0.175	0.306	0.529	0.686	0.882	0.943	1.000						
(8, 8)	0.000	0.001	0.009	0.032	0.100	0.214	0.405	0.595	0.786	0.900	0.968	0.991	0.999	1.000	1.000					
(8, 9)	0.000	0.001	0.005	0.020	0.069	0.157	0.319	0.500	0.702	0.843	0.939	0.980	0.996	0.999	0.999	1.000				
(8, 10)	0.000	0.000	0.003	0.013	0.048	0.117	0.251	0.419	0.621	0.782	0.903	0.964	0.990	0.998	0.999	1.000				
(8, 11)	0.000	0.000	0.002	0.009	0.034	0.088	0.199	0.352	0.547	0.722	0.862	0.943	0.982	0.996	0.999	1.000				
(8, 12)	0.000	0.000	0.001	0.006	0.025	0.067	0.159	0.297	0.480	0.663	0.817	0.920	0.971	0.993	0.998	1.000				
(8, 13)	0.000	0.000	0.001	0.004	0.018	0.052	0.128	0.251	0.421	0.608	0.772	0.894	0.958	0.990	0.996	1.000				
(8, 14)	0.000	0.000	0.001	0.003	0.013	0.041	0.103	0.213	0.369	0.557	0.726	0.867	0.942	0.985	0.994	1.000				
(8, 15)	0.000	0.000	0.000	0.002	0.010	0.032	0.084	0.182	0.325	0.510	0.682	0.839	0.925	0.980	0.991	1.000				
(8, 16)	0.000	0.000	0.000	0.002	0.008	0.026	0.069	0.156	0.286	0.467	0.639	0.810	0.906	0.974	0.988	1.000				
(8, 17)	0.000	0.000	0.000	0.001	0.006	0.021	0.057	0.134	0.252	0.428	0.598	0.782	0.886	0.967	0.984	1.000				
(8, 18)	0.000	0.000	0.000	0.001	0.005	0.017	0.047	0.116	0.223	0.393	0.559	0.754	0.864	0.960	0.980	1.000				
(8, 19)	0.000	0.000	0.000	0.001	0.004	0.014	0.040	0.101	0.197	0.361	0.523	0.726	0.843	0.952	0.976	1.000				
(8, 20)	0.000	0.000	0.000	0.001	0.003	0.011	0.033	0.088	0.175	0.332	0.489	0.699	0.821	0.943	0.972	1.000				
(9, 9)	0.000	0.000	0.003	0.012	0.044	0.109	0.238	0.399	0.601	0.762	0.891	0.956	0.988	0.997	0.999	0.999	1.000			
(9, 10)	0.000	0.000	0.002	0.008	0.029	0.077	0.179	0.319	0.510	0.681	0.834	0.923	0.974	0.992	0.999	0.999	0.999	1.000		
(9, 11)	0.000	0.000	0.001	0.005	0.020	0.055	0.135	0.255	0.430	0.605	0.773	0.885	0.955	0.985	0.997	0.999	0.999	1.000		
(9, 12)	0.000	0.000	0.001	0.003	0.014	0.040	0.103	0.205	0.362	0.535	0.711	0.843	0.931	0.975	0.993	0.999	0.999	1.000		
(9, 13)	0.000	0.000	0.000	0.002	0.010	0.029	0.079	0.166	0.305	0.472	0.650	0.799	0.903	0.963	0.988	0.998	0.999	1.000		
(9, 14)	0.000	0.000	0.000	0.001	0.007	0.022	0.061	0.135	0.257	0.416	0.593	0.754	0.872	0.948	0.981	0.996	0.998	1.000		
(9, 15)	0.000	0.000	0.000	0.001	0.005	0.017	0.048	0.110	0.217	0.367	0.539	0.710	0.839	0.931	0.973	0.994	0.998	1.000		
(9, 16)	0.000	0.000	0.000	0.001	0.004	0.013	0.038	0.091	0.184	0.325	0.489	0.668	0.805	0.913	0.963	0.991	0.996	1.000		
(9, 17)	0.000	0.000	0.000	0.001	0.003	0.010	0.030	0.075	0.157	0.287	0.444	0.626	0.770	0.893	0.951	0.988	0.995	1.000		
(9, 18)	0.000	0.000	0.000	0.001	0.002	0.008	0.024	0.063	0.134	0.255	0.402	0.587	0.735	0.872	0.939	0.984	0.993	1.000		
(9, 19)	0.000	0.000	0.000	0.000	0.002	0.006	0.019	0.052	0.114	0.226	0.365	0.550	0.701	0.851	0.925	0.980	0.991	1.000		
(9, 20)	0.000	0.000	0.000	0.000	0.001	0.005	0.016	0.044	0.098	0.201	0.331	0.516	0.667	0.830	0.910	0.976	0.988	1.000		
(10, 10)	0.000	0.000	0.001	0.004	0.019	0.051	0.128	0.242	0.414	0.586	0.758	0.872	0.949	0.981	0.996	0.999	0.999	0.999	1.000	1.000
(10, 11)	0.000	0.000	0.001	0.003	0.012	0.035	0.092	0.185	0.335	0.500	0.680	0.815	0.915	0.965	0.990	0.997	0.999	0.999	0.999	1.000
(10, 12)	0.000	0.000	0.000	0.002	0.008	0.024	0.067	0.142	0.271	0.425	0.605	0.755	0.875	0.944	0.980	0.994	0.997	0.999	0.999	1.000
(10, 13)	0.000	0.000	0.000	0.001	0.005	0.017	0.049	0.110	0.219	0.361	0.535	0.695	0.831	0.918	0.968	0.990	0.995	0.999	0.999	1.000
(10, 14)	0.000	0.000	0.000	0.001	0.004	0.012	0.037	0.086	0.178	0.306	0.472	0.637	0.784	0.889	0.952	0.983	0.992	0.999	0.999	1.000
(10, 15)	0.000	0.000	0.000	0.000	0.002	0.009	0.028	0.067	0.144	0.260	0.415	0.582	0.736	0.857	0.933	0.976	0.988	0.998	0.999	1.000
(10, 16)	0.000	0.000	0.000	0.000	0.002	0.007	0.021	0.053	0.118	0.222	0.364	0.530	0.689	0.824	0.912	0.966	0.983	0.998	0.999	1.000
(10, 17)	0.000	0.000	0.000	0.000	0.001	0.005	0.016	0.042	0.097	0.189	0.320	0.483	0.642	0.790	0.888	0.955	0.976	0.996	0.999	1.000
(10, 18)	0.000	0.000	0.000	0.000	0.001	0.004	0.012	0.034	0.080	0.162	0.281	0.439	0.598	0.756	0.863	0.943	0.969	0.995	0.999	1.000
(10, 19)	0.000	0.000	0.000	0.000	0.001	0.003	0.010	0.028	0.066	0.139	0.247	0.400	0.555	0.722	0.837	0.930	0.961	0.993	0.998	1.000
(10, 20)	0.000	0.000	0.000	0.000	0.000	0.002	0.008	0.022	0.055	0.120	0.218	0.364	0.516	0.689	0.810	0.915	0.949	0.991	0.997	1.000

Tabla 11C.1 Probabilidades acumuladas p de la distribución de corridas.

(m, n)	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
(11, 11)	0.000	0.000	0.000	0.002	0.007	0.023	0.063	0.135	0.260	0.410	0.590	0.740	0.865	0.937	0.977	0.993	0.998	0.999	0.999	0.999
(11, 12)	0.000	0.000	0.000	0.001	0.005	0.015	0.044	0.099	0.202	0.335	0.507	0.665	0.809	0.901	0.959	0.985	0.996	0.999	0.999	0.999
(11, 13)	0.000	0.000	0.000	0.001	0.003	0.010	0.031	0.074	0.157	0.273	0.433	0.593	0.749	0.860	0.936	0.974	0.992	0.998	0.999	0.999
(11, 14)	0.000	0.000	0.000	0.000	0.002	0.007	0.022	0.055	0.122	0.223	0.369	0.527	0.688	0.815	0.908	0.960	0.986	0.996	0.999	0.999
(11, 15)	0.000	0.000	0.000	0.000	0.001	0.005	0.016	0.042	0.096	0.183	0.314	0.466	0.629	0.769	0.876	0.942	0.977	0.993	0.998	0.999
(11, 16)	0.000	0.000	0.000	0.000	0.001	0.003	0.012	0.032	0.076	0.150	0.266	0.412	0.573	0.723	0.841	0.922	0.967	0.989	0.997	0.999
(11, 17)	0.000	0.000	0.000	0.000	0.000	0.002	0.009	0.024	0.060	0.124	0.227	0.363	0.520	0.676	0.804	0.900	0.954	0.984	0.995	0.999
(11, 18)	0.000	0.000	0.000	0.000	0.000	0.001	0.006	0.019	0.048	0.103	0.193	0.321	0.471	0.632	0.767	0.876	0.939	0.978	0.992	0.999
(11, 19)	0.000	0.000	0.000	0.000	0.000	0.001	0.005	0.015	0.038	0.085	0.164	0.283	0.426	0.589	0.729	0.851	0.923	0.971	0.989	0.998
(11, 20)	0.000	0.000	0.000	0.000	0.000	0.001	0.004	0.012	0.031	0.071	0.140	0.250	0.385	0.548	0.691	0.825	0.905	0.963	0.985	0.997
(12, 12)	0.000	0.000	0.000	0.001	0.003	0.009	0.030	0.070	0.150	0.263	0.421	0.579	0.737	0.850	0.930	0.970	0.991	0.997	0.999	0.999
(12, 13)	0.000	0.000	0.000	0.000	0.002	0.006	0.020	0.050	0.113	0.207	0.348	0.500	0.664	0.793	0.894	0.950	0.982	0.994	0.997	0.999
(12, 14)	0.000	0.000	0.000	0.000	0.001	0.004	0.014	0.036	0.085	0.163	0.286	0.430	0.594	0.735	0.852	0.925	0.969	0.989	0.997	0.999
(12, 15)	0.000	0.000	0.000	0.000	0.001	0.003	0.010	0.026	0.064	0.129	0.235	0.368	0.528	0.676	0.806	0.896	0.953	0.981	0.994	0.998
(12, 16)	0.000	0.000	0.000	0.000	0.000	0.002	0.007	0.019	0.049	0.102	0.193	0.315	0.467	0.619	0.759	0.863	0.933	0.972	0.990	0.997
(12, 17)	0.000	0.000	0.000	0.000	0.000	0.001	0.005	0.014	0.037	0.081	0.159	0.269	0.412	0.565	0.710	0.828	0.910	0.960	0.984	0.995
(12, 18)	0.000	0.000	0.000	0.000	0.000	0.001	0.003	0.011	0.029	0.065	0.131	0.230	0.363	0.514	0.662	0.792	0.885	0.947	0.977	0.993
(12, 19)	0.000	0.000	0.000	0.000	0.000	0.001	0.003	0.008	0.022	0.052	0.108	0.197	0.319	0.466	0.615	0.755	0.857	0.931	0.969	0.990
(12, 20)	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.006	0.017	0.042	0.090	0.169	0.280	0.423	0.570	0.718	0.828	0.914	0.959	0.986
(13, 13)	0.000	0.000	0.000	0.000	0.001	0.004	0.013	0.034	0.081	0.157	0.277	0.418	0.582	0.723	0.843	0.919	0.966	0.987	0.996	0.999
(13, 14)	0.000	0.000	0.000	0.000	0.000	0.002	0.009	0.024	0.059	0.119	0.221	0.348	0.506	0.652	0.788	0.881	0.945	0.976	0.992	0.998
(13, 15)	0.000	0.000	0.000	0.000	0.000	0.002	0.006	0.017	0.043	0.091	0.175	0.288	0.436	0.585	0.730	0.839	0.918	0.962	0.986	0.995
(13, 16)	0.000	0.000	0.000	0.000	0.000	0.001	0.004	0.012	0.032	0.069	0.140	0.239	0.375	0.521	0.671	0.793	0.887	0.945	0.977	0.992
(13, 17)	0.000	0.000	0.000	0.000	0.000	0.000	0.003	0.008	0.023	0.054	0.111	0.198	0.322	0.463	0.614	0.746	0.853	0.924	0.966	0.987
(13, 18)	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.006	0.018	0.042	0.089	0.164	0.275	0.410	0.559	0.699	0.816	0.900	0.952	0.981
(13, 19)	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.004	0.013	0.032	0.071	0.137	0.235	0.362	0.507	0.653	0.777	0.874	0.936	0.973
(13, 20)	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.003	0.010	0.025	0.058	0.114	0.201	0.320	0.459	0.607	0.738	0.847	0.917	0.964
(14, 14)	0.000	0.000	0.000	0.000	0.000	0.001	0.006	0.016	0.041	0.087	0.170	0.280	0.427	0.573	0.720	0.830	0.913	0.959	0.984	0.994
(14, 15)	0.000	0.000	0.000	0.000	0.000	0.001	0.004	0.011	0.029	0.064	0.131	0.225	0.358	0.500	0.652	0.775	0.875	0.936	0.973	0.989
(14, 16)	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.007	0.021	0.048	0.101	0.180	0.299	0.434	0.585	0.718	0.832	0.908	0.957	0.982
(14, 17)	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.005	0.015	0.035	0.078	0.145	0.249	0.374	0.523	0.661	0.786	0.877	0.938	0.972
(14, 18)	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.004	0.011	0.027	0.060	0.117	0.207	0.323	0.464	0.606	0.739	0.842	0.916	0.960
(14, 19)	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.003	0.008	0.020	0.047	0.094	0.172	0.278	0.411	0.553	0.690	0.805	0.890	0.945
(14, 20)	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.002	0.006	0.015	0.037	0.076	0.143	0.239	0.363	0.503	0.642	0.767	0.862	0.928
(15, 15)	0.000	0.000	0.000	0.000	0.000	0.001	0.002	0.007	0.020	0.046	0.097	0.175	0.291	0.424	0.576	0.709	0.825	0.903	0.954	0.980
(15, 16)	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.005	0.014	0.033	0.073	0.136	0.236	0.358	0.505	0.642	0.771	0.864	0.931	0.967
(15, 17)	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.003	0.010	0.024	0.055	0.106	0.191	0.300	0.439	0.578	0.715	0.821	0.902	0.951
(15, 18)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.007	0.017	0.041	0.083	0.155	0.252	0.381	0.517	0.658	0.775	0.869	0.930
(15, 19)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.005	0.013	0.031	0.065	0.125	0.211	0.329	0.461	0.603	0.729	0.833	0.907
(15, 20)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.003	0.009	0.024	0.051	0.101	0.177	0.283	0.410	0.549	0.681	0.795	0.881
(16, 16)	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.003	0.009	0.023	0.053	0.103	0.186	0.293	0.431	0.569	0.707	0.814	0.897	0.947
(16, 17)	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.002	0.006	0.016	0.038	0.078	0.147	0.240	0.366	0.500	0.642	0.760	0.858	0.922
(16, 18)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.004	0.011	0.028	0.059	0.115	0.196	0.309	0.437	0.579	0.705	0.815	0.893
(16, 19)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.003	0.008	0.021	0.045	0.091	0.159	0.260	0.380	0.519	0.650	0.770	0.860
(16, 20)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.002	0.006	0.015	0.034	0.072	0.130	0.219	0.330	0.463	0.596	0.722	0.824
(17, 17)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.004	0.011	0.027	0.057	0.112	0.191	0.303	0.429	0.571	0.697	0.809	0.888
(17, 18)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.003	0.007	0.019	0.042	0.086	0.151	0.249	0.366	0.504	0.634	0.757	0.849
(17, 19)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.002	0.005	0.014	0.031	0.066	0.120	0.205	0.311	0.442	0.573	0.702	0.806
(17, 20)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.004	0.010	0.023	0.051	0.096	0.168	0.263	0.385	0.515	0.647	0.760
(18, 18)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.002	0.005	0.013	0.030	0.064	0.117	0.200	0.305	0.435	0.565	0.695	0.800
(18, 19)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.003	0.009	0.022	0.048	0.091	0.161	0.253	0.373	0.500	0.634	0.747
(18, 20)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.002	0.007	0.016	0.036	0.070	0.129	0.209	0.318	0.440	0.574	0.694
(19, 19)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.002	0.006	0.015	0.035	0.068	0.126	0.204	0.313	0.433	0.567	0.687
(19, 20)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.004	0.011	0.025	0.052	0.098	0.165	0.261	0.373	0.503	0.627
(20, 20)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.001	0.003	0.007	0.018	0.038	0.075	0.130	0.213	0.314	0.438	0.562

Tabla 11C.2 Probabilidades acumuladas p de la distribución de corridas.

(m, n)	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41
(11, 11)	1.000																			
(11, 12)	0.999	1.000																		
(11, 13)	0.999	1.000																		
(11, 14)	0.999	1.000																		
(11, 15)	0.999	1.000																		
(11, 16)	0.999	1.000																		
(11, 17)	0.999	1.000																		
(11, 18)	0.999	1.000																		
(11, 19)	0.997	1.000																		
(11, 20)	0.995	1.000																		
(12, 12)	0.999	0.999	1.000																	
(12, 13)	0.999	0.999	0.999	1.000																
(12, 14)	0.999	0.999	0.999	1.000																
(12, 15)	0.999	0.999	0.999	1.000																
(12, 16)	0.999	0.999	0.999	1.000																
(12, 17)	0.999	0.999	0.999	1.000																
(12, 18)	0.998	0.999	0.999	1.000																
(12, 19)	0.997	0.999	0.999	1.000																
(12, 20)	0.995	0.999	0.999	1.000																
(13, 13)	0.999	0.999	0.999	0.999	1.000															
(13, 14)	0.999	0.999	0.999	0.999	0.999	1.000														
(13, 15)	0.999	0.999	0.999	0.999	0.999	1.000														
(13, 16)	0.998	0.999	0.999	0.999	0.999	1.000														
(13, 17)	0.996	0.999	0.999	0.999	0.999	1.000														
(13, 18)	0.993	0.998	0.999	0.999	0.999	1.000														
(13, 19)	0.989	0.997	0.999	0.999	0.999	1.000														
(13, 20)	0.985	0.995	0.999	0.999	0.999	1.000														
(14, 14)	0.999	0.999	0.999	0.999	0.999	0.999	1.000													
(14, 15)	0.997	0.999	0.999	0.999	0.999	0.999	0.999	1.000												
(14, 16)	0.994	0.998	0.999	0.999	0.999	0.999	0.999	1.000												
(14, 17)	0.989	0.996	0.999	0.999	0.999	0.999	0.999	1.000												
(14, 18)	0.983	0.994	0.998	0.999	0.999	0.999	0.999	1.000												
(14, 19)	0.976	0.991	0.997	0.999	0.999	0.999	0.999	1.000												
(14, 20)	0.966	0.987	0.995	0.999	0.999	0.999	0.999	1.000												
(15, 15)	0.993	0.998	0.999	0.999	0.999	0.999	0.999	0.999	1.000											
(15, 16)	0.987	0.995	0.999	0.999	0.999	0.999	0.999	0.999	0.999	1.000										
(15, 17)	0.979	0.992	0.997	0.999	0.999	0.999	0.999	0.999	0.999	1.000										
(15, 18)	0.968	0.987	0.995	0.999	0.999	0.999	0.999	0.999	0.999	1.000										
(15, 19)	0.954	0.980	0.992	0.997	0.999	0.999	0.999	0.999	0.999	1.000										
(15, 20)	0.938	0.971	0.988	0.996	0.999	0.999	0.999	0.999	0.999	1.000										
(16, 16)	0.977	0.991	0.997	0.999	0.999	0.999	0.999	0.999	0.999	0.999	1.000									
(16, 17)	0.963	0.984	0.994	0.998	0.999	0.999	0.999	0.999	0.999	0.999	0.999	1.000								
(16, 18)	0.946	0.975	0.990	0.996	0.999	0.999	0.999	0.999	0.999	0.999	0.999	1.000								
(16, 19)	0.924	0.963	0.984	0.994	0.998	0.999	0.999	0.999	0.999	0.999	0.999	1.000								
(16, 20)	0.900	0.948	0.976	0.990	0.997	0.999	0.999	0.999	0.999	0.999	0.999	1.000								
(17, 17)	0.943	0.973	0.989	0.996	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	1.000							
(17, 18)	0.917	0.958	0.982	0.993	0.998	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	1.000						
(17, 19)	0.887	0.939	0.971	0.988	0.995	0.998	0.999	0.999	0.999	0.999	0.999	0.999	0.999	1.000						
(17, 20)	0.853	0.917	0.958	0.981	0.992	0.997	0.999	0.999	0.999	0.999	0.999	0.999	0.999	1.000						
(18, 18)	0.883	0.936	0.970	0.987	0.995	0.998	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	1.000					
(18, 19)	0.844	0.909	0.954	0.978	0.991	0.997	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	1.000				
(18, 20)	0.801	0.879	0.935	0.967	0.986	0.994	0.998	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	1.000				
(19, 19)	0.796	0.874	0.932	0.965	0.985	0.994	0.998	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	1.000			
(19, 20)	0.744	0.835	0.905	0.948	0.976	0.989	0.996	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	1.000		
(20, 20)	0.686	0.787	0.870	0.925	0.962	0.982	0.993	0.997	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	0.999	1.000

12. Distribución del estadístico ρ_s de Spearman

$$\rho_s = 1 - \frac{6 \sum d_i^2}{n^3 - n}$$

donde d_i es la diferencia de rangos para el individuo i.

Notas:

- $-1 \leq \rho_s \leq 1$.

- La distribución de ρ_s es simétrica, luego $P(\rho_s \geq r_s) = P(\rho_s \leq -r_s)$.

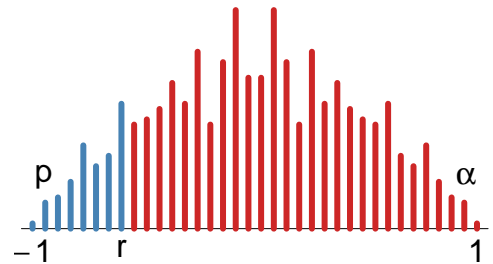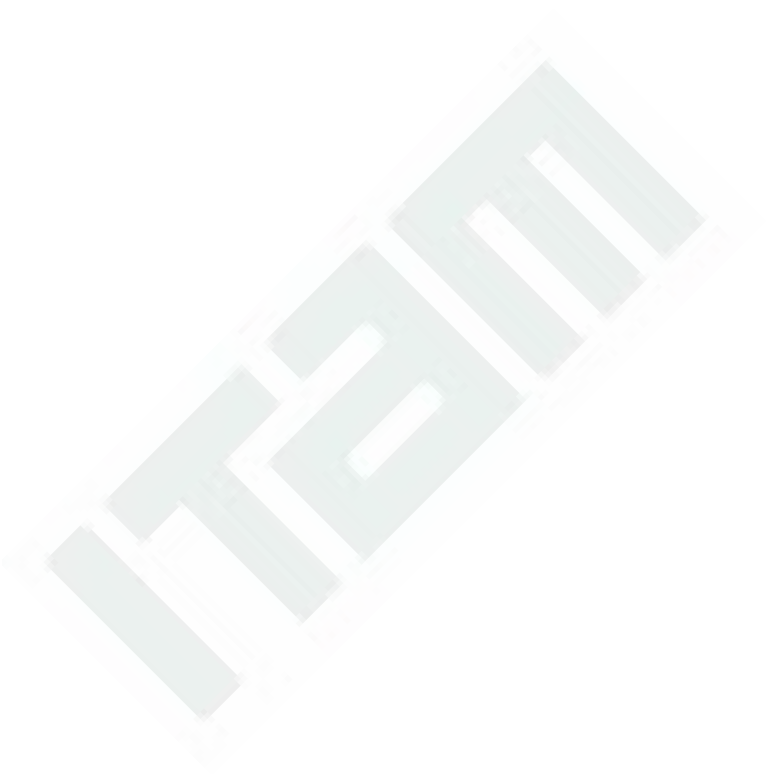$$\mathrm{p} = P(\rho_s \leq r) = \sum_k P(\rho_s = k) = 1 - \alpha$$

Tabla 12. Valores críticos $r_{(\alpha;n)}$ de la distribución ρ_s de Spearman*.

		p					p		
	0.99	0.975	0.95	0.90		0.99	0.975	0.95	0.90
		α					α		
n	0.01	0.025	0.05	0.10	n	0.01	0.025	0.05	0.10
5	1.000	1.000	0.900	0.800	53	0.320	0.271	0.228	0.179
6	0.943	0.886	0.829	0.657	54	0.317	0.268	0.226	0.177
7	0.893	0.786	0.714	0.571	55	0.314	0.266	0.224	0.175
8	0.833	0.738	0.643	0.524	56	0.311	0.264	0.222	0.174
9	0.783	0.700	0.600	0.483	57	0.308	0.261	0.220	0.172
10	0.745	0.648	0.564	0.455	58	0.306	0.259	0.218	0.171
11	0.709	0.618	0.536	0.427	59	0.303	0.257	0.216	0.169
12	0.678	0.587	0.503	0.406	60	0.301	0.254	0.214	0.168
13	0.648	0.560	0.484	0.385	61	0.298	0.252	0.213	0.166
14	0.626	0.538	0.464	0.367	62	0.296	0.250	0.211	0.165
15	0.604	0.521	0.446	0.354	63	0.293	0.248	0.209	0.163
16	0.582	0.503	0.429	0.341	64	0.291	0.246	0.207	0.162
17	0.566	0.488	0.414	0.328	65	0.289	0.244	0.206	0.161
18	0.550	0.472	0.401	0.317	66	0.287	0.243	0.204	0.160
19	0.535	0.458	0.390	0.307	67	0.284	0.241	0.203	0.158
20	0.521	0.446	0.379	0.299	68	0.282	0.239	0.201	0.157
21	0.508	0.435	0.369	0.291	69	0.280	0.237	0.200	0.156
22	0.497	0.425	0.360	0.284	70	0.278	0.235	0.198	0.155
23	0.486	0.415	0.352	0.277	71	0.276	0.234	0.197	0.154
24	0.475	0.406	0.344	0.271	72	0.274	0.232	0.195	0.153
25	0.466	0.398	0.337	0.265	73	0.272	0.230	0.194	0.152
26	0.457	0.390	0.330	0.259	74	0.271	0.229	0.193	0.151
27	0.448	0.382	0.324	0.254	75	0.269	0.227	0.191	0.150
28	0.440	0.375	0.317	0.249	76	0.267	0.226	0.190	0.149
29	0.432	0.368	0.312	0.245	77	0.265	0.224	0.189	0.148
30	0.425	0.362	0.306	0.240	78	0.264	0.223	0.188	0.147
31	0.418	0.356	0.301	0.236	79	0.262	0.221	0.186	0.146
32	0.412	0.350	0.296	0.232	80	0.260	0.220	0.185	0.145
33	0.405	0.345	0.291	0.229	81	0.259	0.219	0.184	0.144
34	0.399	0.340	0.287	0.225	82	0.257	0.217	0.183	0.143
35	0.394	0.335	0.283	0.222	83	0.255	0.216	0.182	0.142
36	0.388	0.330	0.279	0.218	84	0.254	0.215	0.181	0.141
37	0.383	0.325	0.275	0.215	85	0.252	0.213	0.180	0.140
38	0.378	0.321	0.271	0.212	86	0.251	0.212	0.179	0.139
39	0.373	0.317	0.267	0.209	87	0.250	0.211	0.177	0.139
40	0.368	0.313	0.264	0.207	88	0.248	0.210	0.176	0.138
41	0.364	0.309	0.261	0.204	89	0.247	0.209	0.175	0.137
42	0.359	0.305	0.257	0.201	90	0.245	0.207	0.174	0.136
43	0.355	0.301	0.254	0.199	91	0.244	0.206	0.173	0.135
44	0.351	0.298	0.251	0.197	92	0.243	0.205	0.173	0.135
45	0.347	0.294	0.248	0.194	93	0.241	0.204	0.172	0.134
46	0.343	0.291	0.246	0.192	94	0.240	0.203	0.171	0.133
47	0.340	0.288	0.243	0.190	95	0.239	0.202	0.170	0.133
48	0.336	0.285	0.240	0.188	96	0.238	0.201	0.169	0.132
49	0.333	0.282	0.238	0.186	97	0.236	0.200	0.168	0.131
50	0.329	0.279	0.235	0.184	98	0.235	0.199	0.167	0.130
51	0.326	0.276	0.233	0.182	99	0.234	0.198	0.166	0.130
52	0.323	0.274	0.231	0.180	100	0.233	0.197	0.165	0.129

*Para $n \geq 19$, se presentan aproximaciones por medio de series de Edgeworth.

13. Distribución del estadístico U de Mann-Whitney

Sean $X_1, ..., X_m$ y $Y_1, ..., Y_n$ muestras aleatorias.
Se define el estadístico de Mann-Whitney U por

$$U = \sum R(X_i) - \frac{m(m+1)}{2}$$

donde $\sum R(X_i)$ denota la suma de los rangos de las X_i en la muestra conjunta de X y Y.

Notas:

- La distribución de U es simétrica en m y n.

- Para valores de m y n mayores a 40, la distribución de U se aproxima mediante la distribución normal.
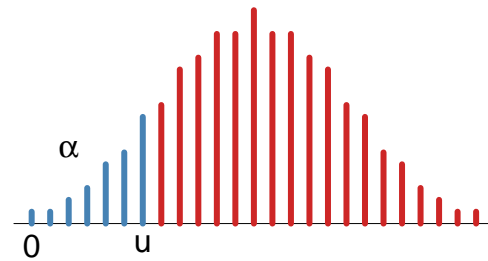
Sean $F_X(x)$ y $F_Y(y)$ las funciones de probabilidad acumulada de X y Y respectivamente y suponga que $F_X(x) = F_Y(x + \delta)$. Se desea contrastar, con una significancia α, la hipótesis $H_0 : \delta = 0$, contra distintas alternativas H_a.

1. $H_a : \delta > 0$.

   Si $U \leq U(\alpha; m, n)$, se rechaza entonces la hipótesis H_0.
   Si $U > U(\alpha; m, n)$, no se rechaza la hipótesis H_0.

2. $H_a : \delta < 0$.

   Si $U \geq mn - U(\alpha; m, n)$, se rechaza entonces la hipótesis H_0.
   Si $U < mn - U(\alpha; m, n)$, no se rechaza la hipótesis H_0.

3. $H_a : \delta \neq 0$.

   Si $U \leq U(\alpha/2; m, n)$ ó $U \geq mn - U(\alpha/2; m, n)$, se rechaza entonces la hipótesis H_0.
   Si $U(\alpha/2; m, n) < U < mn - U(\alpha; m, n)$, no se rechaza la hipótesis H_0.

La prueba Mann-Whitney se puede aplicar para contrastar las medianas η_X y η_Y, de las distribuciones de X y de Y. Si $\eta_X = \eta_Y + \delta$, se puede considerar la hipótesis $H_0 : \delta = 0$, contra las anteriores alternativas I–III. A saber, para $\delta = 0$,

$$H_0 : \eta_X = \eta_Y.$$

1. $H_a : \eta_X < \eta_Y$.

   Si $U \leq U(\alpha; m, n)$, se rechaza la hipótesis H_0 en favor de H_a.

2. $H_a : \eta_X > \eta_Y$.

   Si $U \geq mn - U(\alpha; m, n)$, se rechaza la hipótesis H_0 en favor de H_a.

3. $H_a : \eta_X \neq \eta_Y$.

   Si $U \leq U(\alpha/2; m, n)$ ó $U \geq mn - U(\alpha/2; m, n)$, se rechaza la hipótesis H_0 en favor de H_a.

Tabla 13A.1 Valores críticos $U_{(\alpha;m,n)}$ del estadístico de Mann-Whitney

$\alpha = 0.01$

m	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
2	−	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
3	−	−	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
4	−	−	−	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
5	−	−	0	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
6	−	−	1	2	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.
7	−	0	1	3	4	6	.	.	.	.	.	.	.	.	.	.	.	.	.
8	−	0	2	4	6	7	9	.	.	.	.	.	.	.	.	.	.	.	.
9	−	1	3	5	7	9	11	14	.	.	.	.	.	.	.	.	.	.	.
10	−	1	3	6	8	11	13	16	19	.	.	.	.	.	.	.	.	.	.
11	−	1	4	7	9	12	15	18	22	25	.	.	.	.	.	.	.	.	.
12	−	2	5	8	11	14	17	21	24	28	31	.	.	.	.	.	.	.	.
13	0	2	5	9	12	16	20	23	27	31	35	39	.	.	.	.	.	.	.
14	0	2	6	10	13	17	22	26	30	34	38	43	47	.	.	.	.	.	.
15	0	3	7	11	15	19	24	28	33	37	42	47	51	56	.	.	.	.	.
16	0	3	7	12	16	21	26	31	36	41	46	51	56	61	66	.	.	.	.
17	0	4	8	13	18	23	28	33	38	44	49	55	60	66	71	77	.	.	.
18	0	4	9	14	19	24	30	36	41	47	53	59	65	70	76	82	88	.	.
19	1	4	9	15	20	26	32	38	44	50	56	63	69	75	82	88	94	101	.
20	1	5	10	16	22	28	34	40	47	53	60	67	73	80	87	93	100	107	114
21	1	5	11	17	23	30	36	43	50	57	64	71	78	85	92	99	106	113	121
22	1	5	11	18	24	31	38	45	53	60	67	75	82	90	97	105	112	120	127
23	1	6	12	19	26	33	40	48	55	63	71	79	87	94	102	110	118	126	134
24	1	6	13	20	27	35	42	50	58	66	75	83	91	99	108	116	124	133	141
25	1	7	13	21	29	36	45	53	61	70	78	87	95	104	113	122	130	139	148
26	1	7	14	22	30	38	47	55	64	73	82	91	100	109	118	127	136	146	155
27	2	7	15	23	31	40	49	58	67	76	85	95	104	114	123	133	142	152	162
28	2	8	16	24	33	42	51	60	70	79	89	99	109	119	129	139	149	159	169
29	2	8	16	25	34	43	53	63	73	83	93	103	113	123	134	144	155	165	176
30	2	9	17	26	35	45	55	65	76	86	96	107	118	128	139	150	161	172	182
31	2	9	18	27	37	47	57	68	78	89	100	111	122	133	144	156	167	178	189
32	2	9	18	28	38	49	59	70	81	92	104	115	127	138	150	161	173	185	196
33	2	10	19	29	40	50	61	73	84	96	107	119	131	143	155	167	179	191	203
34	3	10	20	30	41	52	64	75	87	99	111	123	135	148	160	173	185	198	210
35	3	11	20	31	42	54	66	78	90	102	115	127	140	153	165	178	191	204	217
36	3	11	21	32	44	56	68	80	93	106	118	131	144	158	171	184	197	211	224
37	3	11	22	33	45	57	70	83	96	109	122	135	149	162	176	190	203	217	231
38	3	12	22	34	46	59	72	85	99	112	126	139	153	167	181	195	209	224	238
39	3	12	23	35	48	61	74	88	101	115	129	144	158	172	187	201	216	230	245
40	3	13	24	36	49	63	76	90	104	119	133	148	162	177	192	207	222	237	252

Nota: Los caracteres "−" y "·" se refieren a valores inexistentes y valores que se pueden obtener por simetría respectivamente.

Tabla 13A.2 Valores críticos $U_{(\alpha;m,n)}$ del estadístico de Mann-Whitney

$\alpha = 0.01$

m	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
21	128	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
22	135	143	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
23	142	150	158	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
24	150	158	167	175	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
25	157	166	175	184	192	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
26	164	173	183	192	201	211	.	.	.	.	.	.	.	.	.	.	.	.	.	.
27	171	181	191	201	210	220	230	.	.	.	.	.	.	.	.	.	.	.	.	.
28	179	189	199	209	219	230	240	250	.	.	.	.	.	.	.	.	.	.	.	.
29	186	197	207	218	228	239	250	260	271	.	.	.	.	.	.	.	.	.	.	.
30	193	204	215	226	237	248	259	270	282	293	.	.	.	.	.	.	.	.	.	.
31	201	212	223	235	246	258	269	281	292	304	315	.	.	.	.	.	.	.	.	.
32	208	220	232	243	255	267	279	291	303	315	327	339	.	.	.	.	.	.	.	.
33	215	228	240	252	264	277	289	301	314	326	338	351	363	.	.	.	.	.	.	.
34	223	235	248	261	273	286	299	312	324	337	350	363	376	388	.	.	.	.	.	.
35	230	243	256	269	282	295	309	322	335	348	361	375	388	401	414	.	.	.	.	.
36	237	251	264	278	291	305	319	332	346	359	373	387	400	414	428	441	.	.	.	.
37	245	259	273	286	300	314	328	342	356	371	385	399	413	427	441	455	469	.	.	.
38	252	266	281	295	309	324	338	353	367	382	396	411	425	440	454	469	484	498	.	.
39	259	274	289	304	318	333	348	363	378	393	408	423	438	453	468	483	498	513	528	.
40	267	282	297	312	328	343	358	373	389	404	419	435	450	466	481	496	512	527	543	558

Tabla 13B.1 Valores críticos $U_{(\alpha;m,n)}$ del estadístico de Mann-Whitney

$\alpha = 0.025$

m	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
2	−	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
3	−	−	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
4	−	−	0	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
5	−	0	1	2	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
6	−	1	2	3	5	·	·	·	·	·	·	·	·	·	·	·	·	·	·
7	−	1	3	5	6	8	·	·	·	·	·	·	·	·	·	·	·	·	·
8	0	2	4	6	8	10	13	·	·	·	·	·	·	·	·	·	·	·	·
9	0	2	4	7	10	12	15	17	·	·	·	·	·	·	·	·	·	·	·
10	0	3	5	8	11	14	17	20	23	·	·	·	·	·	·	·	·	·	·
11	0	3	6	9	13	16	19	23	26	30	·	·	·	·	·	·	·	·	·
12	1	4	7	11	14	18	22	26	29	33	37	·	·	·	·	·	·	·	·
13	1	4	8	12	16	20	24	28	33	37	41	45	·	·	·	·	·	·	·
14	1	5	9	13	17	22	26	31	36	40	45	50	55	·	·	·	·	·	·
15	1	5	10	14	19	24	29	34	39	44	49	54	59	64	·	·	·	·	·
16	1	6	11	15	21	26	31	37	42	47	53	59	64	70	75	·	·	·	·
17	2	6	11	17	22	28	34	39	45	51	57	63	69	75	81	87	·	·	·
18	2	7	12	18	24	30	36	42	48	55	61	67	74	80	86	93	99	·	·
19	2	7	13	19	25	32	38	45	52	58	65	72	78	85	92	99	106	113	·
20	2	8	14	20	27	34	41	48	55	62	69	76	83	90	98	105	112	119	127
21	3	8	15	22	29	36	43	50	58	65	73	80	88	96	103	111	119	126	134
22	3	9	16	23	30	38	45	53	61	69	77	85	93	101	109	117	125	133	141
23	3	9	17	24	32	40	48	56	64	73	81	89	98	106	115	123	132	140	149
24	3	10	17	25	33	42	50	59	67	76	85	94	102	111	120	129	138	147	156
25	3	10	18	27	35	44	53	62	71	80	89	98	107	117	126	135	145	154	163
26	4	11	19	28	37	46	55	64	74	83	93	102	112	122	132	141	151	161	171
27	4	11	20	29	38	48	57	67	77	87	97	107	117	127	137	147	158	168	178
28	4	12	21	30	40	50	60	70	80	90	101	111	122	132	143	154	164	175	186
29	4	13	22	32	42	52	62	73	83	94	105	116	127	138	149	160	171	182	193
30	5	13	23	33	43	54	65	76	87	98	109	120	131	143	154	166	177	189	200
31	5	14	24	34	45	56	67	78	90	101	113	125	136	148	160	172	184	196	208
32	5	14	24	35	46	58	69	81	93	105	117	129	141	153	166	178	190	203	215
33	5	15	25	37	48	60	72	84	96	108	121	133	146	159	171	184	197	210	222
34	5	15	26	38	50	62	74	87	99	112	125	138	151	164	177	190	203	217	230
35	6	16	27	39	51	64	77	89	103	116	129	142	156	169	183	196	210	224	237
36	6	16	28	40	53	66	79	92	106	119	133	147	161	174	188	202	216	231	245
37	6	17	29	41	55	68	81	95	109	123	137	151	165	180	194	209	223	238	252
38	6	17	30	43	56	70	84	98	112	127	141	156	170	185	200	215	230	245	259
39	7	18	31	44	58	72	86	101	115	130	145	160	175	190	206	221	236	252	267
40	7	18	31	45	59	74	89	103	119	134	149	165	180	196	211	227	243	258	274

Tabla 13B.2 Valores críticos $U_{(\alpha;m,n)}$ del estadístico de Mann-Whitney

$\alpha = 0.025$

m	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
21	142	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
22	150	158	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
23	157	166	175	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
24	165	174	183	192	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
25	173	182	192	201	211	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
26	181	191	200	210	220	230	·	·	·	·	·	·	·	·	·	·	·	·	·	·
27	188	199	209	219	230	240	250	·	·	·	·	·	·	·	·	·	·	·	·	·
28	196	207	218	228	239	250	261	272	·	·	·	·	·	·	·	·	·	·	·	·
29	204	215	226	238	249	260	271	282	294	·	·	·	·	·	·	·	·	·	·	·
30	212	223	235	247	258	270	282	293	305	317	·	·	·	·	·	·	·	·	·	·
31	220	232	244	256	268	280	292	304	316	328	341	·	·	·	·	·	·	·	·	·
32	227	240	252	265	277	290	302	315	328	340	353	365	·	·	·	·	·	·	·	·
33	235	248	261	274	287	300	313	326	339	352	365	378	391	·	·	·	·	·	·	·
34	243	256	270	283	297	310	323	337	350	364	377	391	404	418	·	·	·	·	·	·
35	251	265	278	292	306	320	334	348	361	375	389	403	417	431	445	·	·	·	·	·
36	259	273	287	301	316	330	344	358	373	387	401	416	430	445	459	473	·	·	·	·
37	267	281	296	311	325	340	355	369	384	399	414	428	443	458	473	488	503	·	·	·
38	275	290	305	320	335	350	365	380	395	411	426	441	456	472	487	502	517	533	·	·
39	282	298	313	329	344	360	376	391	407	422	438	454	469	485	501	516	532	548	564	·
40	290	306	322	338	354	370	386	402	418	434	450	466	482	499	515	531	547	563	579	596

Tabla 13C.1 Valores críticos $U_{(\alpha;m,n)}$ del estadístico de Mann-Whitney

$\alpha = 0.05$

m	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
2	−	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
3	−	−	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
4	−	0	1	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
5	0	1	2	4	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
6	0	2	3	5	7	·	·	·	·	·	·	·	·	·	·	·	·	·	·
7	0	2	4	6	8	11	·	·	·	·	·	·	·	·	·	·	·	·	·
8	1	3	5	8	10	13	15	·	·	·	·	·	·	·	·	·	·	·	·
9	1	3	6	9	12	15	18	21	·	·	·	·	·	·	·	·	·	·	·
10	1	4	7	11	14	17	20	24	27	·	·	·	·	·	·	·	·	·	·
11	1	5	8	12	16	19	23	27	31	34	·	·	·	·	·	·	·	·	·
12	2	5	9	13	17	21	26	30	34	38	42	·	·	·	·	·	·	·	·
13	2	6	10	15	19	24	28	33	37	42	47	51	·	·	·	·	·	·	·
14	2	7	11	16	21	26	31	36	41	46	51	56	61	·	·	·	·	·	·
15	3	7	12	18	23	28	33	39	44	50	55	61	66	72	·	·	·	·	·
16	3	8	14	19	25	30	36	42	48	54	60	65	71	77	83	·	·	·	·
17	3	9	15	20	26	33	39	45	51	57	64	70	77	83	89	96	·	·	·
18	4	9	16	22	28	35	41	48	55	61	68	75	82	88	95	102	109	·	·
19	4	10	17	23	30	37	44	51	58	65	72	80	87	94	101	109	116	123	·
20	4	11	18	25	32	39	47	54	62	69	77	84	92	100	107	115	123	130	138
21	5	11	19	26	34	41	49	57	65	73	81	89	97	105	113	121	130	138	146
22	5	12	20	28	36	44	52	60	68	77	85	94	102	111	119	128	136	145	154
23	5	13	21	29	37	46	54	63	72	81	90	98	107	116	125	134	143	152	161
24	6	13	22	30	39	48	57	66	75	85	94	103	113	122	131	141	150	160	169
25	6	14	23	32	41	50	60	69	79	89	98	108	118	128	137	147	157	167	177
26	6	15	24	33	43	53	62	72	82	92	103	113	123	133	143	154	164	174	185
27	7	15	25	35	45	55	65	75	86	96	107	117	128	139	149	160	171	182	192
28	7	16	26	36	46	57	68	78	89	100	111	122	133	144	156	167	178	189	200
29	7	17	27	38	48	59	70	82	93	104	116	127	138	150	162	173	185	196	208
30	7	17	28	39	50	61	73	85	96	108	120	132	144	156	168	180	192	204	216
31	8	18	29	40	52	64	76	88	100	112	124	136	149	161	174	186	199	211	224
32	8	19	30	42	54	66	78	91	103	116	128	141	154	167	180	193	206	218	231
33	8	19	31	43	56	68	81	94	107	120	133	146	159	172	186	199	212	226	239
34	9	20	32	45	57	70	84	97	110	124	137	151	164	178	192	206	219	233	247
35	9	21	33	46	59	73	86	100	114	128	141	156	170	184	198	212	226	241	255
36	9	21	34	48	61	75	89	103	117	131	146	160	175	189	204	219	233	248	263
37	10	22	35	49	63	77	91	106	121	135	150	165	180	195	210	225	240	255	271
38	10	23	36	50	65	79	94	109	124	139	154	170	185	201	216	232	247	263	278
39	10	23	38	52	67	82	97	112	128	143	159	175	190	206	222	238	254	270	286
40	11	24	39	53	68	84	99	115	131	147	163	179	196	212	228	245	261	278	294

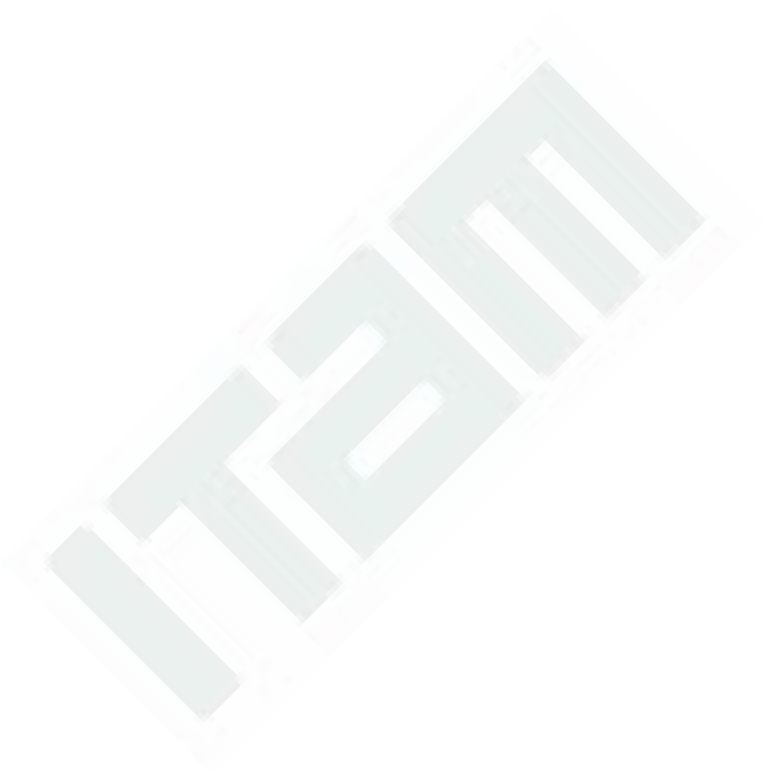Tabla 13C.2 Valores críticos $U_{(\alpha;m,n)}$ del estadístico de Mann-Whitney

$\alpha = 0.05$

m	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
21	154	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
22	162	171	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
23	170	179	189	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
24	179	188	198	207	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
25	187	197	207	217	227	·	·	·	·	·	·	·	·	·	·	·	·	·	·	·
26	195	205	216	226	237	247	·	·	·	·	·	·	·	·	·	·	·	·	·	·
27	203	214	225	236	247	257	268	·	·	·	·	·	·	·	·	·	·	·	·	·
28	212	223	234	245	257	268	279	291	·	·	·	·	·	·	·	·	·	·	·	·
29	220	231	243	255	267	278	290	302	314	·	·	·	·	·	·	·	·	·	·	·
30	228	240	252	264	277	289	301	313	325	338	·	·	·	·	·	·	·	·	·	·
31	236	249	261	287	287	299	312	325	337	350	363	·	·	·	·	·	·	·	·	·
32	244	257	271	284	297	310	323	336	349	362	375	388	·	·	·	·	·	·	·	·
33	253	266	280	293	307	320	334	347	361	374	388	402	415	·	·	·	·	·	·	·
34	261	275	289	303	317	331	345	359	373	387	401	415	429	443	·	·	·	·	·	·
35	269	284	298	312	327	341	356	370	384	399	413	428	442	457	471	·	·	·	·	·
36	277	292	307	322	337	352	366	381	396	411	426	441	456	471	486	501	·	·	·	·
37	286	301	316	331	347	362	377	393	408	423	439	454	470	485	500	516	531	·	·	·
38	294	310	325	341	357	373	388	404	420	436	452	467	483	499	515	531	547	563	·	·
39	302	318	335	351	367	383	399	416	432	448	464	481	497	513	529	546	562	578	595	·
40	311	327	344	360	377	394	410	427	444	460	477	494	511	527	544	561	578	594	611	628

Tabla 13D.1 Valores críticos $U_{(\alpha;m,n)}$ del estadístico de Mann-Whitney

$\alpha = 0.10$

m	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
2	−	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
3	−	0	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
4	0	1	2	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
5	1	2	4	5	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
6	1	3	5	7	9	.	.	.	.	.	.	.	.	.	.	.	.	.	.
7	1	4	6	8	11	13	.	.	.	.	.	.	.	.	.	.	.	.	.
8	2	5	7	10	13	16	19	.	.	.	.	.	.	.	.	.	.	.	.
9	2	5	9	12	15	18	22	25	.	.	.	.	.	.	.	.	.	.	.
10	3	6	10	13	17	21	24	28	32	.	.	.	.	.	.	.	.	.	.
11	3	7	11	15	19	23	27	31	36	40	.	.	.	.	.	.	.	.	.
12	4	8	12	17	21	26	30	35	39	44	49	.	.	.	.	.	.	.	.
13	4	9	13	18	23	28	33	38	43	48	53	58	.	.	.	.	.	.	.
14	4	10	15	20	25	31	36	41	47	52	58	63	69	.	.	.	.	.	.
15	5	10	16	22	27	33	39	45	51	57	63	68	74	80	.	.	.	.	.
16	5	11	17	23	29	36	42	48	54	61	67	74	80	86	93	.	.	.	.
17	6	12	18	25	31	38	45	52	58	65	72	79	85	92	99	106	.	.	.
18	6	13	20	27	34	41	48	55	62	69	77	84	91	98	106	113	120	.	.
19	7	14	21	28	36	43	51	58	66	73	81	89	97	104	112	120	128	135	.
20	7	15	22	30	38	46	54	62	70	78	86	94	102	110	119	127	135	143	151
21	8	15	23	31	40	48	56	65	73	82	91	99	108	116	125	134	142	151	160
22	8	16	25	33	42	51	59	68	77	86	95	104	113	122	131	141	150	159	168
23	8	17	26	35	44	53	62	72	81	90	100	109	119	128	138	147	157	167	176
24	9	18	27	36	46	56	65	75	85	95	105	114	124	134	144	154	164	174	184
25	9	19	28	38	48	58	68	78	89	99	109	120	130	140	151	161	172	182	193
26	10	20	30	40	50	61	71	82	92	103	114	125	136	146	157	168	179	190	201
27	10	20	31	41	52	63	74	85	96	107	119	130	141	152	164	175	186	198	209
28	11	21	32	43	54	66	77	88	100	112	123	135	147	158	170	182	194	206	217
29	11	22	33	45	56	68	80	92	104	116	128	140	152	164	177	189	201	213	226
30	12	23	35	46	58	71	83	95	108	120	133	145	158	170	183	196	209	221	234
31	12	24	36	48	61	73	86	99	111	124	137	150	163	177	190	203	216	229	242
32	13	25	37	50	63	76	89	102	115	129	142	156	169	183	196	210	223	237	251
33	13	26	38	51	65	78	92	105	119	133	147	161	175	189	203	217	231	245	259
34	13	26	40	53	67	81	95	109	123	137	151	166	180	195	209	224	238	253	267
35	14	27	41	55	69	83	98	112	127	141	156	171	186	201	216	230	245	260	275
36	14	28	42	56	71	86	100	115	131	146	161	176	191	207	222	237	253	268	284
37	15	29	43	58	73	88	103	119	134	150	166	181	197	213	229	244	260	276	292
38	15	30	45	60	75	91	106	122	138	154	170	186	203	219	235	251	268	284	300
39	16	31	46	61	77	93	109	126	142	158	175	192	208	225	242	258	275	292	309
40	16	31	47	63	79	96	112	129	146	163	180	197	214	231	248	265	282	300	317

Tabla 13D.2 Valores críticos $U_{(\alpha;m,n)}$ del estadístico de Mann-Whitney

$\alpha = 0.10$

m	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
21	168	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
22	177	186	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
23	186	195	205	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
24	194	204	215	225	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
25	203	214	224	235	245	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
26	212	223	234	245	256	267	.	.	.	.	.	.	.	.	.	.	.	.	.	.
27	221	232	243	255	266	278	289	.	.	.	.	.	.	.	.	.	.	.	.	.
28	229	241	253	265	277	289	301	313	.	.	.	.	.	.	.	.	.	.	.	.
29	238	250	263	275	287	300	312	324	337	.	.	.	.	.	.	.	.	.	.	.
30	247	260	272	285	298	311	324	336	349	362	.	.	.	.	.	.	.	.	.	.
31	255	269	282	295	308	322	335	348	362	375	388	.	.	.	.	.	.	.	.	.
32	264	278	292	305	319	333	346	360	374	388	401	415	.	.	.	.	.	.	.	.
33	273	287	301	315	330	344	358	372	386	401	415	429	443	.	.	.	.	.	.	.
34	282	296	311	326	340	355	369	384	399	413	428	443	457	472	.	.	.	.	.	.
35	290	306	321	336	351	366	381	396	411	426	441	457	472	487	502	.	.	.	.	.
36	299	315	330	346	361	377	392	408	424	439	455	470	486	502	517	533	.	.	.	.
37	308	324	340	356	372	388	404	420	436	452	468	484	500	516	532	549	565	.	.	.
38	317	333	350	366	382	399	415	432	448	465	481	498	515	531	548	564	581	597	.	.
39	325	342	359	376	393	410	427	444	461	478	495	512	529	546	563	580	597	614	631	.
40	334	352	369	386	404	421	438	456	473	491	508	526	543	561	578	595	613	630	648	665

14. Distribución del estadístico D de Kolmogorov-Smirnov

Sea F^* la distribución conocida, F la distribución de la variable X y F_n la función de distribución empírica. Se supone que X es una variable aleatoria continua.
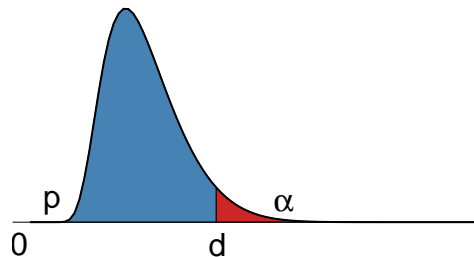
Para probar: $H_0{:}F(x) = F^*(x)$

$$D = \sup_x\{|F^*(x) - F_n(x)|\}$$

Para probar: $H_0{:}F(x) \geq F^*(x)$

$$D^+ = \sup_x\{F^*(x) - F_n(x)\}$$

Para probar: $H_0{:}F(x) \leq F^*(x)$

$$D^- = \sup_x\{F_n(x) - F^*(x)\}$$

En los tres casos, la hipótesis nula debe rechazarse si el estadístico correspondiente es mayor que el cuantil al nivel de significancia deseado[1]. Para $n > 50$ se presenta una aproximación del cuantil correcto utilizando la distribución asintótica de los estadísticos[2].

Tabla 14. Valores críticos $D^+_{(\alpha;n)}$ de la distribución de Kolmogorov-Smirnov.

	p						p			
	0.99	0.975	0.95	0.90			0.99	0.975	0.95	0.90
	α						α			
n	0.01	0.025	0.05	0.010	n		0.01	0.025	0.05	0.10
1	0.990	0.975	0.950	0.900	26		0.290	0.259	0.233	0.204
2	0.900	0.842	0.776	0.684	27		0.284	0.254	0.229	0.200
3	0.785	0.708	0.636	0.565	28		0.279	0.250	0.225	0.197
4	0.689	0.624	0.565	0.493	29		0.275	0.246	0.221	0.193
5	0.627	0.563	0.509	0.447	30		0.270	0.242	0.218	0.190
6	0.577	0.519	0.468	0.410	31		0.266	0.238	0.214	0.187
7	0.538	0.483	0.436	0.382	32		0.262	0.234	0.211	0.184
8	0.507	0.454	0.410	0.358	33		0.258	0.231	0.208	0.182
9	0.480	0.430	0.387	0.339	34		0.254	0.227	0.205	0.179
10	0.457	0.409	0.369	0.323	35		0.251	0.224	0.202	0.177
11	0.437	0.391	0.352	0.308	36		0.247	0.221	0.199	0.174
12	0.419	0.375	0.338	0.296	37		0.244	0.218	0.196	0.172
13	0.404	0.361	0.326	0.285	38		0.241	0.215	0.194	0.170
14	0.390	0.349	0.314	0.275	39		0.238	0.213	0.191	0.168
15	0.377	0.338	0.304	0.266	40		0.235	0.210	0.189	0.165
16	0.366	0.327	0.295	0.258	41		0.232	0.208	0.187	0.163
17	0.355	0.318	0.286	0.250	42		0.229	0.205	0.185	0.162
18	0.346	0.309	0.279	0.244	43		0.227	0.203	0.183	0.160
19	0.337	0.301	0.271	0.237	44		0.224	0.201	0.181	0.158
20	0.329	0.294	0.265	0.232	45		0.222	0.198	0.179	0.156
21	0.321	0.287	0.259	0.226	46		0.219	0.196	0.177	0.155
22	0.314	0.281	0.253	0.221	47		0.217	0.194	0.175	0.153
23	0.307	0.275	0.247	0.216	48		0.215	0.192	0.173	0.151
24	0.301	0.269	0.242	0.212	49		0.213	0.190	0.171	0.150
25	0.295	0.264	0.238	0.208	50		0.211	0.188	0.170	0.148
					$n > 50$		$\frac{1.517}{\sqrt{n}}$	$\frac{1.358}{\sqrt{n}}$	$\frac{1.224}{\sqrt{n}}$	$\frac{1.073}{\sqrt{n}}$

[1]La distribución del estadístico D^- es la misma que la de D^+. Los valores críticos para el estadístico D son los presentados para el nivel 2α.

[2]El error de aproximación es menor que 4×10^{-3} para ambas pruebas.

15.　Distribución del estadístico W^+ de Wilcoxon

Sea $X_1, X_2, \ldots, X_n$ una muestra aleatoria.

$$W^+ = \sum R_i I_{\{X_i > 0\}}$$

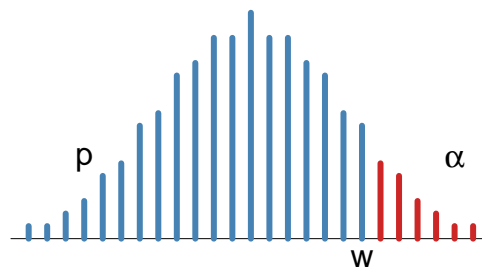donde R_i es el rango de X_i e $I_{\{\cdot\}}$ es la función indicadora.

$$\mathrm{p} = \Pr(W^+ \leq w)$$

Tabla 15A. Probabilidades acumuladas $\Pr(W_n^+ \leq w)$ de la distribución del estadístico W_n^+ de Wilcoxon.

w	n 2	3	4	5	6	7	8	9	10
0	0.2500	0.1250	0.0625	0.0312	0.0156	0.0078	0.0039	0.0020	0.0010
1	0.5000	0.2500	0.1250	0.0625	0.0312	0.0156	0.0078	0.0039	0.0020
2	0.7500	0.3750	0.1875	0.0938	0.0469	0.0234	0.0117	0.0059	0.0029
3	1.0000	0.6250	0.3125	0.1562	0.0781	0.0391	0.0195	0.0098	0.0049
4		0.7500	0.4375	0.2188	0.1094	0.0547	0.0273	0.0137	0.0068
5		0.8750	0.5625	0.3125	0.1562	0.0781	0.0391	0.0195	0.0098
6		1.0000	0.6875	0.4062	0.2188	0.1094	0.0547	0.0273	0.0137
7			0.8125	0.5000	0.2812	0.1484	0.0742	0.0371	0.0186
8			0.8750	0.5938	0.3438	0.1875	0.0977	0.0488	0.0244
9			0.9375	0.6875	0.4219	0.2344	0.1250	0.0645	0.0322
10			1.0000	0.7812	0.5000	0.2891	0.1562	0.0820	0.0420
11				0.8438	0.5781	0.3438	0.1914	0.1016	0.0527
12				0.9062	0.6562	0.4062	0.2305	0.1250	0.0654
13				0.9375	0.7188	0.4688	0.2734	0.1504	0.0801
14				0.9688	0.7812	0.5312	0.3203	0.1797	0.0967
15				1.0000	0.8438	0.5938	0.3711	0.2129	0.1162
$\vdots$					$\vdots$	$\vdots$	$\vdots$	$\vdots$	$\vdots$
39								0.9805	0.8838
40								0.9863	0.9033
41								0.9902	0.9199
42								0.9941	0.9346
43								0.9961	0.9473
44								0.9980	0.9580
45								1.0000	0.9678
46									0.9756
47									0.9814
48									0.9863
49									0.9902
50									0.9932
51									0.9951
52									0.9971
53									0.9980
54									0.9990
55									1.0000

Tabla 15B. Valores críticos $w^+_{(\alpha;n)}$ de la distribución de Wilcoxon.

				p					
	0.01	0.025	0.05	0.10	0.90	0.95	0.975	0.99	
				α					
n	0.99	0.975	0.95	0.90	0.10	0.05	0.025	0.01	$n(n+1)/2$
10	6	9	11	15	40	44	46	49	55
11	8	11	14	18	48	52	55	58	66
12	10	14	18	22	56	60	64	68	78
13	13	18	22	27	64	69	73	78	91
14	16	22	26	32	73	79	83	89	105
15	20	26	31	37	83	89	94	100	120
16	24	30	36	43	93	100	106	112	136
17	28	35	42	49	104	111	118	125	153
18	33	41	48	56	115	123	130	138	171
19	38	47	54	63	127	136	143	152	190
20	44	53	61	70	140	149	157	166	210
21	50	59	68	78	153	163	172	181	231
22	56	66	76	87	166	177	187	197	253
23	63	74	84	95	181	192	202	213	276
24	70	82	92	105	195	208	218	230	300
25	77	90	101	114	211	224	235	248	325
26	85	99	111	125	226	240	252	266	351
27	93	108	120	135	243	258	270	285	378
28	102	117	131	146	260	275	289	304	406
29	111	127	141	158	277	294	308	324	435
30	121	138	152	170	295	313	327	344	465
31	131	148	164	182	314	332	348	365	496
32	141	160	176	195	333	352	368	387	528
33	152	171	188	208	353	373	390	409	561
34	163	183	201	222	373	394	412	432	595
35	174	196	214	236	394	416	434	456	630
36	186	209	228	251	415	438	457	480	666
37	199	222	242	266	437	461	481	504	703
38	212	236	257	282	459	484	505	529	741
39	225	250	272	298	482	508	530	555	780
40	239	265	287	314	506	533	555	581	820

Notas:

1. En esta tabla $\alpha = \Pr\left(W^+ \geq w_{(\alpha,n)}\right)$.

2. La distribución de W^+ es simétrica alrededor de $n(n+1)/2$, por lo que
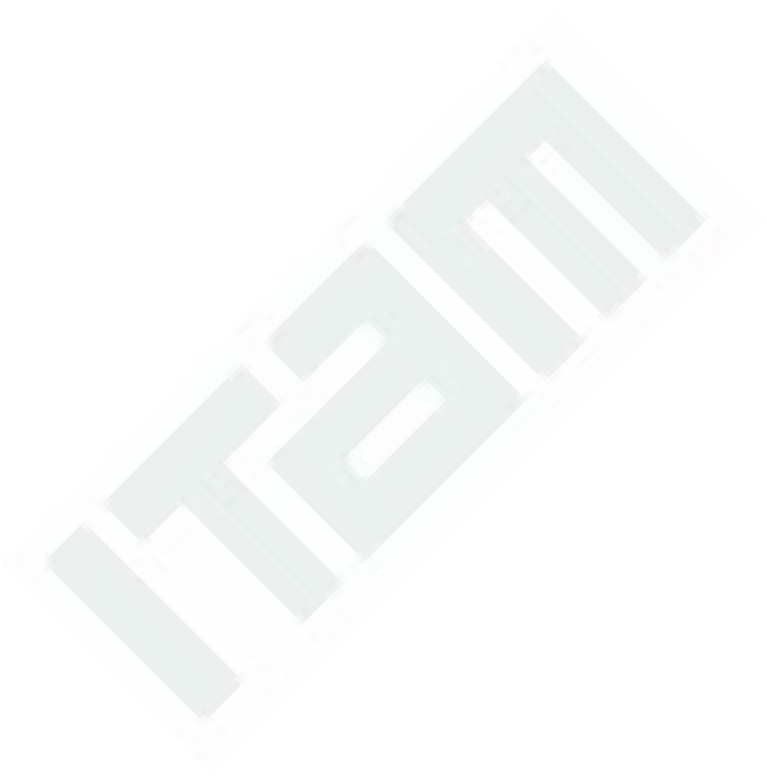
$$w_{(p,n)} = \frac{n(n+1)}{2} - w_{(1-p,n)}$$

3. Para $n > 40$ puede utilizar la aproximación

$$w_{(p,n)} \approx \frac{n(n+1)}{4} + z_p \sqrt{\frac{n(n+1)(2n+1)}{24}}$$

donde z_p es el p-ésimo cuantil de la distribución normal estándar, i.e., $p = \Phi(z_p)$.

16.   1050 Números Seudoaleatorios

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	82207	32971	61821	07315	05123	49509	90787	40307	17954	39359	03509	41932	43282	68591	47877
2	08782	88748	93209	02753	51060	20520	95553	00304	79373	25619	30230	70305	21380	27406	84985
3	03897	78310	00843	36634	88682	01283	18719	05062	58450	03007	18043	82009	48034	04251	18956
4	31066	29277	39356	68641	93508	67156	48082	82129	77012	73662	58886	12708	29393	07233	91496
5	70691	36787	30040	86232	45147	26600	06145	34248	55430	73805	69535	70709	07467	33263	75402
6	05473	12332	29330	91235	71281	56367	92870	67289	15497	91458	86862	66026	36217	26543	94725
7	66636	94524	39277	13253	56450	27705	40385	45780	46888	01992	24363	24922	39112	91854	27677
8	72813	65324	37927	59485	56667	31734	65678	88267	67990	38285	03004	37612	68859	42143	99716
9	50139	20777	09743	09944	51075	08054	08237	56341	60524	11440	77426	12225	83228	30083	08031
10	08305	08720	45241	56392	70316	22790	49750	27856	88651	20872	45309	45738	63223	31353	75646
11	09732	10854	21679	23452	78626	03967	32638	34731	13096	89622	96556	49203	16957	86919	82242
12	06394	20244	41751	02024	92900	98611	93004	67680	43594	64250	76547	77016	86194	34316	13515
13	11775	46653	28843	57869	78131	14760	05781	80610	98863	25172	13139	84419	50756	13884	93264
14	05492	36719	45201	34011	53980	16243	96598	63744	62028	69860	61257	80528	66348	06244	19489
15	84217	03832	39880	90499	51196	27703	33593	78317	98902	82734	32279	00439	28388	80217	18720
16	35602	93562	46721	58406	74254	18811	08743	41168	27447	70694	54801	95152	52571	14835	59536
17	18937	31233	69786	27423	61189	73842	95420	28386	07615	05336	82037	09500	63224	55901	05859
18	09063	72987	22942	73570	99178	74670	86925	52416	42298	05322	04194	59593	64814	89117	81064
19	68686	29310	27737	41013	71361	70101	87117	73214	13145	54469	17946	22718	04640	11577	44776
20	94005	63168	99225	32729	38332	20433	80957	93792	42603	04600	76042	58495	60616	50111	07848
21	68729	09294	20553	60615	47547	95868	27575	28445	75083	57291	15750	11610	63546	35273	17333
22	61437	46400	83356	93696	41961	82064	74905	22200	22864	27586	02415	69494	69663	64862	81553
23	67205	52661	44940	65867	47850	19618	34954	96868	98198	38242	04384	93983	78381	35914	46828
24	81435	01444	69273	83712	04884	12117	82171	64567	26240	77157	03304	74675	27520	33186	50510
25	35931	83937	10333	78759	05037	03009	45646	70365	71554	02507	35697	47666	63533	34112	90591
26	29107	34375	28918	02651	32807	86061	07634	48297	02864	68798	84678	96942	07619	24987	92411
27	90077	02749	73330	41414	95824	65587	40375	67842	49525	63674	03170	48362	40050	05777	08439
28	94296	76997	31616	37554	08270	67042	32544	29185	15643	06072	70927	71644	71104	04424	16527
29	78466	24707	06113	49373	50945	95451	58550	42748	77981	78868	49284	07178	37543	48830	43691
30	24715	47704	81971	80046	58200	93027	44994	77322	30296	82056	59420	77465	08361	06568	49460
31	87308	60352	89109	15387	87582	35140	53967	38850	90938	54470	70389	35013	44122	33961	54571
32	96027	08859	53132	31129	21942	78718	43613	90474	61483	00138	88732	75923	29391	15449	04077
33	50097	07108	72610	27253	86750	28086	39437	67703	17628	06197	50731	29454	39432	73065	03546
34	13275	51460	87908	30894	31955	03957	32518	67123	16800	83785	51182	35737	45671	22024	02831
35	34327	31136	78592	39142	86501	72157	63527	74013	76571	87286	06946	13135	90821	12435	11876
36	44247	78593	55878	43412	43229	18323	89169	07109	60604	10544	27785	35265	46138	61232	49986
37	26040	85864	16778	71500	71092	13622	92687	44602	49380	20154	74640	69627	56552	02323	97439
38	78618	40504	02604	57240	06697	23727	63192	16315	99058	04616	17027	00662	07209	34427	97181
39	87347	99792	18053	68564	62756	08622	15321	90718	29674	82069	33948	49601	97345	18781	04994
40	80088	22869	56309	44646	22752	91753	08212	79369	50526	42499	16318	12735	13826	66726	90387
41	48543	65583	01521	16999	97872	10458	39045	38358	00317	60506	00099	93084	33072	42085	33138
42	12746	72369	88929	07235	44319	34906	78656	34954	74594	96445	51104	54658	32172	50619	06772
43	54959	24443	22348	87977	95615	61691	65636	20590	28991	11429	66437	06514	81454	73091	93854
44	63750	64262	57639	90103	14477	79209	75450	91035	04374	16419	89987	18093	36065	84075	82521
45	31078	98829	00648	58021	95043	59644	46876	07478	71748	35035	28377	78314	44956	73710	42747
46	43124	64862	36209	29283	60822	66093	00365	48681	58598	63975	04758	95095	11269	05001	23589
47	43025	74904	27636	84706	67750	72582	36718	04183	22380	96030	54652	16280	48384	36434	41464
48	79155	22329	61951	18687	32898	02136	43242	60520	87246	43448	60134	82182	66493	45007	93803
49	69978	33341	57891	24062	72470	81311	20359	67782	29891	66677	16188	83486	31076	00575	60955
50	95986	86287	20945	28844	18291	87287	06384	05109	22216	29425	45199	17817	42741	64886	82736
51	89260	01121	89550	86257	48235	35045	11439	37364	28969	16983	31708	09253	22202	35854	98413
52	70348	95862	10251	85670	30137	89658	21653	94004	41721	47262	27860	87321	20735	04350	55524
53	36057	56642	69166	42068	99118	22337	58790	94750	79523	43035	90875	47546	79240	58578	92376
54	14822	56346	34764	01974	96148	31068	28547	27859	65449	46979	40955	99165	61754	87738	34071
55	14861	05403	98439	63040	81557	96735	23649	69837	08667	13695	71573	60711	35702	08571	01896
56	92519	01665	42921	70981	69109	24056	61950	82158	73354	94756	85887	48311	51023	28261	15316
57	33432	78296	80872	91904	49754	55938	98134	83517	95264	30988	03039	19727	41776	53424	78041
58	85477	95660	43894	51113	31450	27637	75221	22127	14441	82722	98994	89319	00185	89949	11289
59	96733	11979	58208	47759	30551	38510	65681	74183	61242	14056	96089	39000	78819	82582	94105
60	95071	31306	51364	90976	23021	18136	89260	99351	03051	04622	75100	05123	32264	78105	38241
61	31762	50916	33590	22597	60078	96242	55968	07185	01308	01061	84467	25558	92507	90732	63759
62	74194	44604	83439	85492	28450	14910	81475	07563	45893	88970	64756	78089	45884	80353	01839
63	08009	73767	82915	35867	78324	94670	20362	24641	53489	06511	67402	90585	35593	92179	92200
64	19493	59379	53859	04117	96045	43959	20782	39648	88951	53974	32391	52822	31603	87594	35509
65	81881	47467	29274	30934	22320	73655	72771	44895	87941	85621	92089	40424	80042	76452	88664
66	65602	02360	40533	54264	36303	19012	03235	65292	43814	94427	93421	05174	16599	76135	60482
67	64218	33987	84448	44521	87606	05917	19605	15402	76479	73181	33173	38720	83412	53840	43411
68	15774	49562	70491	11895	48996	70008	39219	60029	35009	72325	51324	28218	83398	72611	36070
69	14027	23287	32715	90935	13858	21421	54507	80184	00922	41586	07130	76427	12043	25585	57165
70	51995	52431	58043	62695	51833	92116	87174	95566	09210	65367	38960	99917	35136	01280	16504

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