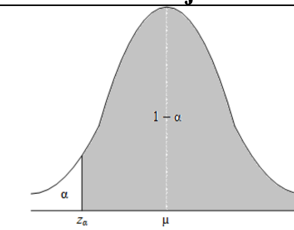
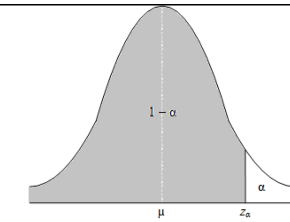
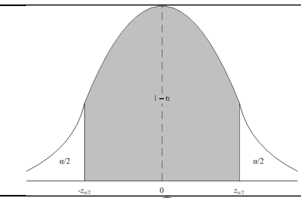
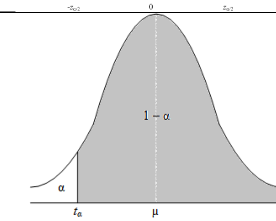
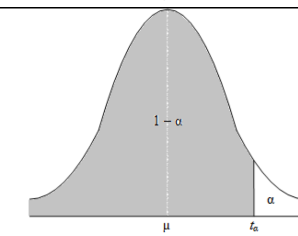
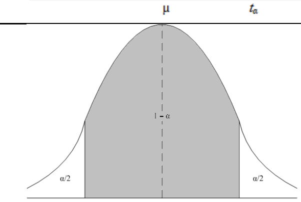
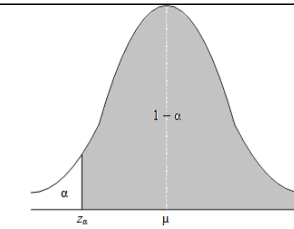
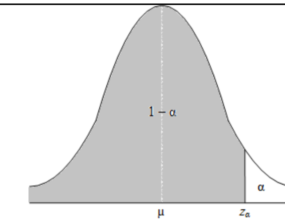
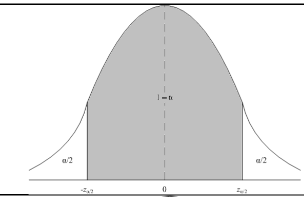
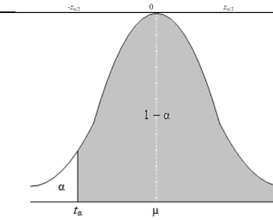
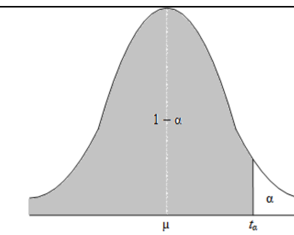
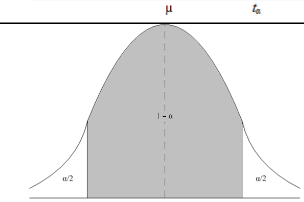
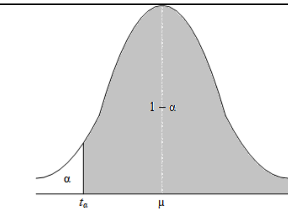
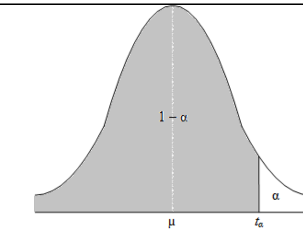
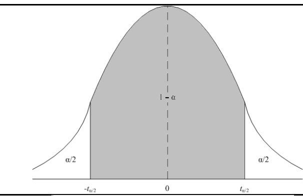
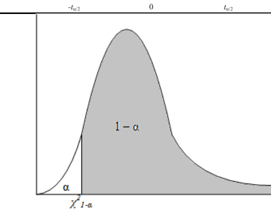
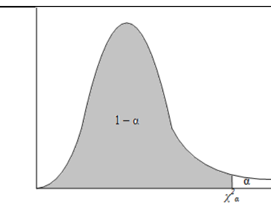
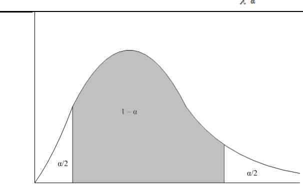
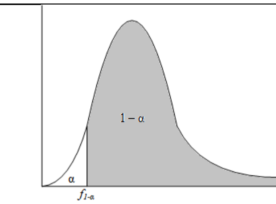
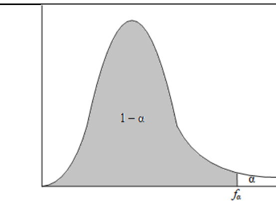
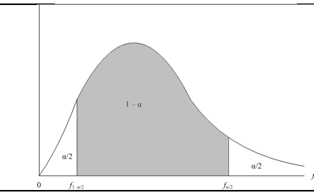
Inferencia Estadística – Prueba de Hipótesis

Prueba de hipótesis clásica: prueba de nivel α

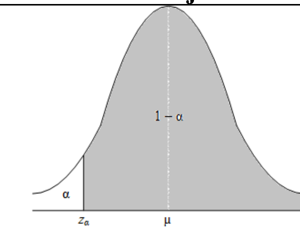
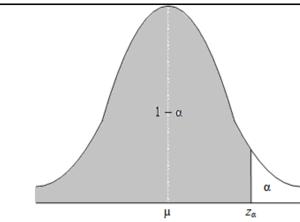
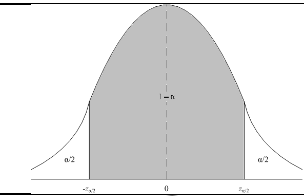
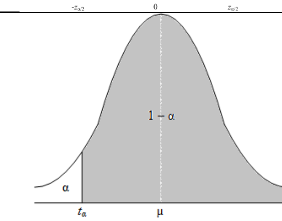
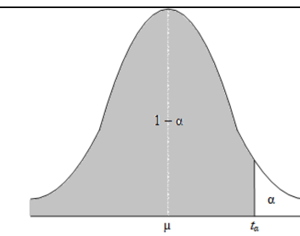
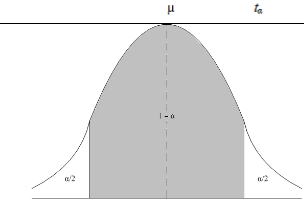
Hipótesis Nula H_0	Tipo de Prueba	N° Muestras	Valor del Estadístico	Hipótesis Alternativa H_1	Región Crítica	Dibujo
$\mu = \mu_0$	Unilateral (una cola) – LI	1	$z = \frac{\bar{x} - \mu_0}{\sigma/\sqrt{n}}$ σ conocida	$\mu < \mu_0$	$z < -z_\alpha$	
	Unilateral (una cola) – LS			$\mu > \mu_0$	$z > z_\alpha$	
	Bilateral (dos colas)			$\mu \neq \mu_0$	$z < -z_{\alpha/2}$ y $z > z_{\alpha/2}$	
$\mu = \mu_0$	Unilateral (una cola) – LI	1	$t = \frac{\bar{x} - \mu_0}{s/\sqrt{n}}$ $v = n - 1$ σ desconocida	$\mu < \mu_0$	$t < -t_\alpha$	
	Unilateral (una cola) – LS			$\mu > \mu_0$	$t > t_\alpha$	
	Bilateral (dos colas)			$\mu \neq \mu_0$	$t < -t_{\alpha/2}$ y $t > t_{\alpha/2}$	

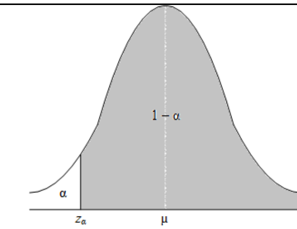
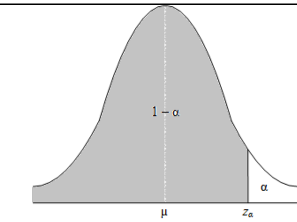
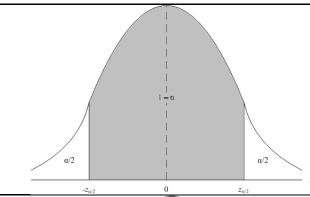
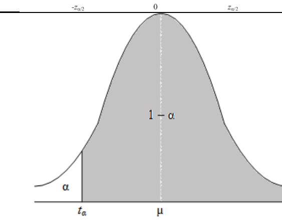
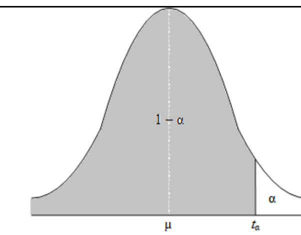
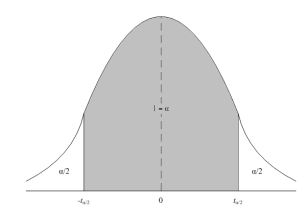
$\mu_1 - \mu_2 = d_0$	Unilateral (una cola) – LI	2	$z = \frac{(\bar{x}_1 - \bar{x}_2) - d_0}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}}$ σ_1 y σ_2 conocidas	$\mu_1 - \mu_2 < d_0$	$z < -z_\alpha$	
	Unilateral (una cola) – LS			$\mu_1 - \mu_2 > d_0$	$z > z_\alpha$	
	Bilateral (dos colas)			$\mu_1 - \mu_2 \neq d_0$	$z < -z_{\alpha/2}$ y $z > z_{\alpha/2}$	
$\mu_1 - \mu_2 = d_0$	Unilateral (una cola) – LI	2	$t = \frac{(\bar{x}_1 - \bar{x}_2) - d_0}{s_p\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$ $s_p = \sqrt{\frac{(n_1 - 1)S_1^2 + (n_2 - 1)S_2^2}{n_1 + n_2 - 2}}$ $v = n_1 + n_2 - 2$ $\sigma_1 = \sigma_2$ y desconocidas	$\mu_1 - \mu_2 < d_0$	$t < -t_\alpha$	
	Unilateral (una cola) – LS			$\mu_1 - \mu_2 > d_0$	$t > t_\alpha$	
	Bilateral (dos colas)			$\mu_1 - \mu_2 \neq d_0$	$t < -t_{\alpha/2}$ y $t > t_{\alpha/2}$	

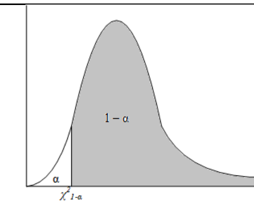
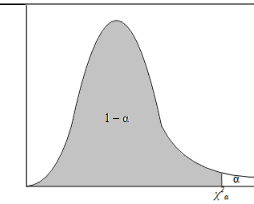
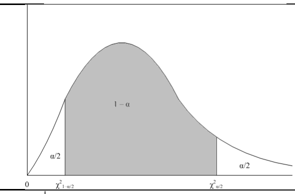
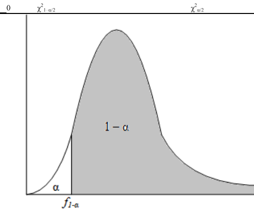
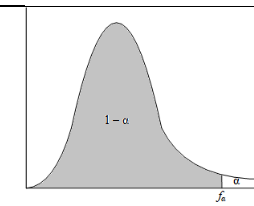
$\mu_1 - \mu_2 = d_0$	Unilateral (una cola) – LI	2	$t' = \dfrac{(\bar{x}_1 - \bar{x}_2) - d_0}{\sqrt{\dfrac{s_1^2}{n_1} + \dfrac{s_2^2}{n_2}}}$ $v = \dfrac{\left(\dfrac{s_1^2}{n_1} + \dfrac{s_2^2}{n_2}\right)^2}{\dfrac{\left(\dfrac{s_1^2}{n_1}\right)^2}{v_1} + \dfrac{\left(\dfrac{s_2^2}{n_2}\right)^2}{v_2}}$ $v_1 = n_1 - 1$ $v_2 = n_2 - 1$ $\sigma_1 \neq \sigma_2$ y desconocidas	$\mu_1 - \mu_2 < d_0$	$t' < -t_\alpha$	
	Unilateral (una cola) – LS			$\mu_1 - \mu_2 > d_0$	$t' > t_\alpha$	
	Bilateral (dos colas)			$\mu_1 - \mu_2 \neq d_0$	$t' < -t_{\alpha/2}$ y $t' > t_{\alpha/2}$	
$\sigma^2 = \sigma_0^2$	Unilateral (una cola) – LI	1	$\chi^2 = \dfrac{(n-1)s^2}{\sigma_0^2}$ $v = n - 1$	$\sigma^2 < \sigma_0^2$	$\chi^2 < \chi_{1-\alpha}^2$	
	Unilateral (una cola) – LS			$\sigma^2 > \sigma_0^2$	$\chi^2 > \chi_\alpha^2$	
	Bilateral (dos colas)			$\sigma^2 \neq \sigma_0^2$	$\chi^2 < \chi_{1-\alpha/2}^2$ y $\chi^2 > \chi_{\alpha/2}^2$	

$\sigma_1^2 = \sigma_2^2$	Unilateral (una cola) – LI	2	$f = \frac{s_1^2}{s_2^2}$ $v_1 = n_1 - 1$ $v_2 = n_2 - 1$	$\sigma_1^2 < \sigma_2^2$	$f < f_{1-\alpha}(v_1, v_2)$	
	Unilateral (una cola) – LS			$\sigma_1^2 > \sigma_2^2$	$f > f_{\alpha}(v_1, v_2)$	
	Bilateral (dos colas)			$\sigma_1^2 \neq \sigma_2^2$	$f < f_{1-\alpha/2}(v_1, v_2)$ y $f > f_{\alpha/2}(v_1, v_2)$	

Prueba de hipótesis con el valor *P*

Hipótesis Nula H_0	Tipo de Prueba	N° Muestras	Hipótesis Alternativa H_1	Valor *P*	Cálculo	Dibujo
$\mu = \mu_0$ σ conocida $z_{obs} = \frac{\bar{x} - \mu_0}{\sigma/\sqrt{n}}$	Unilateral (una cola) – LI	1	$\mu < \mu_0$	$P(Z \leq z_{obs})$	$P(z_{obs})$	
	Unilateral (una cola) – LS		$\mu > \mu_0$	$P(Z \geq z_{obs})$	$1 - P(z_{obs})$	
	Bilateral (dos colas)		$\mu \neq \mu_0$	$P(\lvert Z \rvert \geq \lvert z_{obs} \rvert)$	$2 * (1 - P(\lvert z_{obs} \rvert))$	
$\mu = \mu_0$ σ desconocida $t_{obs} = \frac{\bar{x} - \mu_0}{s/\sqrt{n}}$	Unilateral (una cola) – LI	1	$\mu < \mu_0$	$P(T \leq t_{obs})$	$1 - P(t_{obs})$	
	Unilateral (una cola) – LS		$\mu > \mu_0$	$P(T \geq t_{obs})$	$P(t_{obs})$	
	Bilateral (dos colas)		$\mu \neq \mu_0$	$P(\lvert T \rvert \geq \lvert t_{obs} \rvert)$	$2 * (P(\lvert t_{obs} \rvert))$	

$\mu_1 - \mu_2 = d_0$ σ_1 y σ_2 conocidas $z_{obs} = \dfrac{(\bar{x}_1 - \bar{x}_2) - d_0}{\sqrt{\dfrac{\sigma_1^2}{n_1} + \dfrac{\sigma_2^2}{n_2}}}$	Unilateral (una cola) – LI	2	$\mu_1 - \mu_2 < d_0$	$P(Z \leq z_{obs})$	$P(z_{obs})$	
	Unilateral (una cola) – LS		$\mu_1 - \mu_2 > d_0$	$P(Z \geq z_{obs})$	$1 - P(z_{obs})$	
	Bilateral (dos colas)		$\mu_1 - \mu_2 \neq d_0$	$P(\lvert Z \rvert \geq \lvert z_{obs} \rvert)$	$2 * \left(1 - P(\lvert z_{obs} \rvert)\right)$	
$\mu_1 - \mu_2 = d_0$ σ_1 y σ_2 desconocidas $\sigma_1 = \sigma_2$ $t_{obs} = \dfrac{(\bar{x}_1 - \bar{x}_2) - d_0}{s_p\sqrt{\dfrac{1}{n_1} + \dfrac{1}{n_2}}}$ $v = n_1 + n_2 - 2$ $\sigma_1 \neq \sigma_2$ $t_{obs} = \dfrac{(\bar{x}_1 - \bar{x}_2) - d_0}{\sqrt{\dfrac{s_1^2}{n_1} + \dfrac{s_2^2}{n_2}}}$ $v = \dfrac{\left(\dfrac{s_1^2}{n_1} + \dfrac{s_2^2}{n_2}\right)^2}{\dfrac{\left(\dfrac{s_1^2}{n_1}\right)^2}{v_1} + \dfrac{\left(\dfrac{s_2^2}{n_2}\right)^2}{v_2}}$ $v_1 = n_1 - 1$ $v_2 = n_2 - 1$	Unilateral (una cola) – LI	2	$\mu_1 - \mu_2 < d_0$	$P(T \leq t_{obs})$	$1 - P(t_{obs})$	
	Unilateral (una cola) – LS		$\mu_1 - \mu_2 > d_0$	$P(T \geq t_{obs})$	$P(t_{obs})$	
	Bilateral (dos colas)		$\mu_1 - \mu_2 \neq d_0$	$P(\lvert T \rvert \geq \lvert t_{obs} \rvert)$	$2 * \left(P(\lvert t_{obs} \rvert)\right)$	

$\sigma^2 = \sigma_0^2$ $\chi^2_{obs} = \frac{(n-1)s^2}{\sigma_0^2}$ $v = n - 1$	Unilateral (una cola) – LI	1	$\sigma^2 < \sigma_0^2$	$P(\chi^2 \le {\chi^2}_{obs})$	$1 - P({\chi^2}_{obs})$	
	Unilateral (una cola) – LS		$\sigma^2 > \sigma_0^2$	$P(\chi^2 \ge {\chi^2}_{obs})$	$P({\chi^2}_{obs})$	
	Bilateral (dos colas)		$\sigma^2 \ne \sigma_0^2$	$2 * min\left(P(\chi^2 \le {\chi^2}_{obs}), P(\chi^2 \ge {\chi^2}_{obs})\right)$	$2 * min\left(1 - P({\chi^2}_{obs}), P({\chi^2}_{obs})\right)$	
$\frac{\sigma_1^2}{\sigma_2^2} = r_0$ $F_{obs} = \frac{s_1^2/s_2^2}{r_0}$ $(v_1, v_2) v_1 = n_1 - 1$ $v_2 = n_2 - 1$	Unilateral (una cola) – LI	2	$\sigma_1^2 < \sigma_2^2$	$P(F \le F_{obs})$	$1 - P(F_{obs})$	
	Unilateral (una cola) – LS		$\sigma_1^2 > \sigma_2^2$	$P(F \ge F_{obs})$ (v_1, v_2)	$P(F_{obs})$	
	Bilateral (dos colas)		$\sigma_1^2 \ne \sigma_2^2$	$2 * min(P(F \le F_{obs}), P(F \ge F_{obs}))$	$2 * min(1 - P(F_{obs}), P(F_{obs}))$