Summary of One-Sample Hypothesis-Testing Procedures

Case	Null Hypothesis	Test Statistic	Alternative Hypothesis	Fixed Significance Level Criteria for Rejection	P - value	O.C. Curve Parameter	O.C. Curve Appendix Chart VII
-:	$H_0: \mu = \mu_0$ $\sigma^2 \text{ known}$	$z_0 = \frac{\overline{x} - \mu_0}{\sigma / \sqrt{n}}$	H_1 : $\mu \neq \mu_0$ H_1 : $\mu > \mu_0$	$ z_0 > z_{\alpha/2}$ $z_0 > z_{\alpha}$	$P = 2[1 - \Phi(z_0)]$ Probability above z_0 $P = 1 - \Phi(z_0)$	$d = \mu - \mu_0 /\sigma$ $d = (\mu - \mu_0)/\sigma$	a, b c, d
			H_1 : $\mu < \mu_0$	$z_0 < -z_{\alpha}$	Probability below z_0 $P = \Phi(z_0)$	$d = (\mu_0 - \mu)/\sigma$	c,d
.5	H_0 : $\mu = \mu_0$ σ^2 unknown	$t_0 = \frac{\overline{x} - \mu_0}{s / \sqrt{n}}$	H_1 : $\mu \neq \mu_0$	$\mid t_0 \mid > t_{\alpha/2,n-1}$	Sum of the probability above I_0 and below $-I_0$	$d = \mu - \mu_0 /\sigma$	e, f
			$H_1: \mu > \mu_0$ $H_1: \mu < \mu_0$	$t_0 > t_{\alpha, n-1}$ $t_0 < -t_{\alpha, n-1}$	Probability above t_0 Probability below t_0	$d = (\mu - \mu_0)/G$ $d = (\mu_0 - \mu)/G$	8, h 8, h
હ્યું	H_0 : $\sigma^2 = \sigma_0^2$	$x_0^2 = \frac{(n-1)s^2}{\sigma_0^2}$	$H_1:\sigma^2 eq\sigma_0^2$	$\chi_0^2 > \chi_{\alpha/2,n-1}^2$ or $\chi_0^2 < \chi_{1-\alpha/2,n-1}^2$	See text Section 9.4.	$\lambda = \sigma/\sigma_0$	i,j
			$H_1: \sigma^2 > \sigma_0^2$ $H_1: \sigma^2 < \sigma_0^2$	$\chi_0^2 > \chi_{\alpha,n-1}^2$ $\chi_0^2 < \chi_{1-\alpha,n-1}^2$		$\lambda = \sigma/\sigma_0$ $\lambda = \sigma/\sigma_0$	k, l m, n
4	$H_0: p = p_0$	$z_0 = \frac{x - np_0}{\sqrt{np_0(1 - p_0)}}$	$H_1: p \neq p_0$ $H_1: p > p_0$	$ z_0 > z_{\alpha/2}$ $z_0 > z_{\alpha}$	$p = 2[1 - \Phi(z_0)]$ Probability above z_0 $p = 1 - \Phi(z_0)$	& & & & & & & & & & & & & & & & & & &	4 c c c 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
			$H_1: p < p_0$	$z_0 < -z_{\alpha}$	Probability below z_0 $P = \Phi(z_0)$	3-4	3-4

Summary of One-Sample Confidence Interval Procedures

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Case	Problem Type	Point Estimate	Two-sided $100(1-\alpha)$ Percent Confidence Interval
1.	Mean μ, variance σ² known	χ	$\overline{x} - z_{\alpha/2} \sigma / \sqrt{n} \le \mu \le \overline{x} + z_{\alpha/2} \sigma / \sqrt{n}$
2.	Mean μ of a normal distribution, variance σ^2 unknown	<i>X</i>	$\overline{x} - t_{\alpha/2, n-1} s / \sqrt{n} \leq \mu \leq \overline{x} + t_{\alpha/2, n-1} s / \sqrt{n}$
3.	Variance σ^2 of a normal distribution	S 2 2 8	$\frac{(n-1)s^2}{\chi_{\alpha/2,n-1}^2} \le \sigma^2 \le \frac{(n-1)s^2}{\chi_{1-\alpha/2,n-1}^2}$
4	Proportion or parameter of a binomial distribution p	Ď	$\hat{p} - z_{\alpha/2} \sqrt{\frac{\hat{p}(1-\hat{p})}{n}} \le p \le \hat{p} + z_{\alpha/2} \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$

Summary of Two-Sample Hypothesis-Testing Procedures

O.C. Curve Appendix Chart VII	a, b c, d	e, f 8, h 8, h	£ £ £ £ £ £ £ £ £ £ £ £ £ £ £ £ £ £ £	£ £ £ £ 4 7 7 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	o, p q, r	4 4 4
O.C. Appe	g '5' '5'	9. 00 00	ή ήή	4 44	9,	4 4
O.C. Curve Parameter	$d = \frac{ \mu_1 - \mu_2 - \Delta_0 }{\sqrt{G_1^2 + G_2^2}}$ $d = \frac{\mu_1 - \mu_2 - \Delta_0}{\sqrt{G_1^2 + G_2^2}}$ $d = \frac{\mu_2 - \mu_1 - \Delta_0}{\sqrt{G_1^2 + G_2^2}}$	$d = (\Delta - \Delta_0)/2\sigma$ $d = (\Delta - \Delta_0)/2\sigma$ $d = (\Delta_0 - \Delta)/2\sigma$ where $\Delta = \mu_1 - \mu_2$	£ £ £ £ £ £ £ £ £ £ £ £ £ £ £ £ £ £ £	8 8 8 4 4 8	$\lambda = \sigma_1/\sigma_2$ $\lambda = \sigma_1/\sigma_2$	34 4 8
Par	$d = \frac{ \mu_1 }{\lambda}$ $d = \frac{\mu_1}{\lambda}$ $d = \frac{\mu_2}{\lambda}$	$d = \Delta $ $d = (\Delta)$ $d = (\Delta)$ where			~ ~ = =	
٩	(z ₀)] oove z ₀ z ₀) slow z ₀	bability $ \cos - t_0 $ $ \cos t_0 $ $ \cos t_0 $	bability flow $- t_0 $ sove t_0 slow t_0	bability $ \cos - t_0 $ bove t_0	n 10-5.2.	$(z_0)]$ (z_0) (z_0) (z_0) (z_0)
P - value	$P = 2[1 - \Phi(z_0)]$ Probability above z_0 $P = 1 - \Phi(z_0)$ Probability below z_0 $P = \Phi(z_0)$	Sum of the probability above $ t_0 $ and below $- t_0 $ Probability above t_0 Probability below t_0	Sum of the probability above $ t_0 $ and below $- t_0 $ Probability above t_0 Probability below t_0	Sum of the probability above $ t_0 $ and below $- t_0 $ Probability above t_0 Probability below t_0	See text Section 10-5.2	$P = 2[1 - \Phi(z_0)]$ Probability above z_0 $P = 1 - \Phi(z_0)$ Probability below z_0 $P = \Phi(z_0)$
	<u> </u>	Surabov abov P	Su abov P P	Su abov P P	See	Ā Ā
Fixed Significance Level Criteria for Rejection	$ z_0 > z_{\alpha/2}$ $z_0 > z_{\alpha}$ $z_0 < -z_{\alpha}$	$\begin{aligned} &I_0 \mid > t_{\alpha/2,n_1+n_2-2} \\ &I_0 > t_{\alpha,n_1+n_2-2} \\ &I_0 < -t_{\alpha,n_1+n_2-2} \end{aligned}$	$ t_0 > t_{\alpha/2,\nu}$ $t_0 > t_{\alpha,\nu}$ $t_0 < -t_{\alpha,\nu}$	$ t_0 > t_{\alpha,2,n-1}$ $t_0 > t_{\alpha,n-1}$ $t_0 < -t_{\alpha,n-1}$	$f_0 > f_{\alpha/2,n_1-1,n_2-1}$ or $f_0 < f_{1-\alpha/2,n_1-1,n_2-1}$ $f_0 > f_{\alpha,n_1-1,n_2-1}$	$ z_0 > z_{\alpha/2}$ $z_0 > z_{\alpha}$ $z_0 < -z_{\alpha}$
Fixed S Level for R	02 02	$ t_0 > t$ $t_0 > t$ $t_0 < t$	$t_0 > t_0$	$ t_0 $	$f_0 > f$ $f_0 < f_1$ $f_0 > f_{\alpha}$	02 20 20 20
Alternative Hypothesis	$H_1: \mu_1 - \mu_2 \neq \Delta_0$ $H_1: \mu_1 - \mu_2 > \Delta_0$ $H_1: \mu_1 - \mu_2 < \Delta_0$	$H_1: \mu_1 - \mu_2 \neq \Delta_0$ $H_1: \mu_1 - \mu_2 > \Delta_0$ $H_1: \mu_1 - \mu_2 < \Delta_0$	$H_1: \mu_1 - \mu_2 \neq \Delta_0$ $H_1: \mu_1 - \mu_2 > \Delta_0$ $H_1: \mu_1 - \mu_2 < \Delta_0$	H_1 : $\mu_d \neq 0$ H_1 : $\mu_d > 0$ H_1 : $\mu_d < 0$	$H_1: \sigma_1^2 \neq \sigma_2^2$ $H_1: \sigma_1^2 > \sigma_2^2$	$H_1: p_1 \neq p_2$ $H_1: p_1 > p_2$
Alter Hypo	H_1 : μ_1 . H_1 : μ_1 . H_1 : μ_1 .	H_1 : μ_1 - H_1 : μ_1 - H_1 : μ_1 - H_1 : μ_1 -	$H_1:\mu_1$ $H_1:\mu_1$ $H_1:\mu_1$	H_1 : H_1 : H_1 : H_1 : H_1 : H_2 : H_3 : H_4 :	H_1 : C	H ₁ :1
stic	$\frac{-\Delta_0}{n_2}$	$-\frac{\Delta_0}{n_2}$	$\frac{\overline{X_2} - \Delta_0}{\frac{1}{l_1} + \frac{s_2^2}{h_2}}$ $\frac{1}{l_1} + \frac{s_2^2}{h_2}$ $+ \frac{s_2^2}{h_2}$ $+ \frac{(s_2^2/n_2)^2}{h_2 - 1}$	<u>u</u>	22.5	$\frac{\hat{p}_2}{n_1 + \frac{1}{n_2}}$
Test Statistic	$z_0 = \frac{x_1 - x_2}{\sqrt{n_1} + x_2}$	$t_0 = \frac{\overline{x_1} - \overline{x_2}}{S_P \sqrt{n_1}} +$	$\int_{0}^{1} = \frac{\bar{x}_{1}}{\sqrt{\frac{s_{1}^{2}}{n_{1}}}}$ $\left(\frac{s_{1}^{2}}{n_{1}}\right)^{2}$ $\frac{(s_{1}^{2}/n_{1})^{2}}{n_{1}-1}$	$t_0 = \frac{\overline{d}}{S_d / \sqrt{n}}$	$f_0 = s_1^2 / s_2^2$	$\hat{p}_1 - \hat{p}_2$ $\sqrt{\hat{p}(1-\hat{p}) \left[\frac{1}{n_1}\right]}$
			ž			, 0 , 0 , 0
Null Hypothesis	H_0 : $\mu_1 - \mu_2 = \Delta_0$ σ_1^2 and σ_2^2 known	H_0 : $\mu_1 - \mu_2 = \Delta_0$ $\sigma_1^2 = \sigma_2^2$ unknown	$H_0: \mu_1 - \mu_2 = \Delta_0$ $\sigma_1^2 \neq \sigma_2^2 \text{ unknown}$	Paired data $H_0: \mu_D = 0$	H_0 : $\sigma_1^2 = \sigma_2^2$	H_0 : $p_1 = p_2$
Hy	H_0 : μ σ_1^2 and	H_0 : μ $\sigma_1^2 = c$	H_0 : μ	H_0	H_0	H_0
Case	i-i	7.	κ;	4.	κ.	

Summary of Two-Sample Confidence Interval Procedures

Case	Problem Type	Point Estimate	
1.	Difference in two means μ_1 and μ_2 , variances σ_1^2 and σ_2^2 known	$\overline{x_1} - \overline{x_2}$	$ \overline{x}_1 - \overline{x}_2 - z_{\alpha/2} \sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}} \le \mu_1 - \mu_2 $ $ \le \overline{x}_1 - \overline{x}_2 + z_{\alpha/2} \sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}} $
-	Difference in means of two normal distributions $\mu_1 - \mu_2$, variances $\sigma_1^2 = \sigma_2^2$ and unknown	$\frac{1}{2}$ $-\frac{1}{2}$	$\begin{aligned} & \overline{x}_1 - \overline{x}_2 - t_{\alpha/2, n_1 + n_2 - 2} s_p \sqrt{\frac{1}{n_1} + \frac{1}{n_2}} \le \mu_1 - \mu_2 \\ & \le \overline{x}_1 - \overline{x}_2 + t_{\alpha/2, n_1 + n_2 - 2} s_p \sqrt{\frac{1}{n_1} + \frac{1}{n_2}} \\ & \text{where } s_p = \sqrt{\frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}} \end{aligned}$
દં	Difference in means of two normal distributions $\mu_1 - \mu_2$, variances $\sigma_1^2 \neq \sigma_2^2$ and unknown	$\frac{1}{\sqrt{2}}$	$ \overline{x}_1 - \overline{x}_2 - t_{\alpha/2,\nu} \sqrt{\frac{s_1^2 + s_2^2}{n_1 + s_2^2}} \le \mu_1 - \mu_2 $ $ \le \overline{x}_1 - \overline{x}_2 + t_{\alpha/2,\nu} \sqrt{\frac{s_1^2 + s_2^2}{n_1 + n_2}} $ where $\nu = \frac{(s_1^2 / n_1)^2 + (s_2^2 / n_2)^2}{(s_1^2 / n_1)^2 + (s_2^2 / n_2)^2}$
4.	Difference in means of two normal distributions for paired samples $\mu_0 = \mu_1 - \mu_2$	d d	$\overline{d} - t_{\alpha/2, n-1} s_d / \sqrt{n} \le \mu_D \le \overline{d} + t_{\alpha/2, n-1} s_d / \sqrt{n}$
κ.	Ratio of the variances σ_1^2/σ_2^2 of two normal distributions	$\frac{S_2^2}{N_2^2}$	$\frac{s_1^2}{s_2^2} f_{1-\alpha/2,n_2-1,n_1-1} \le \frac{\sigma_1^2}{\sigma_2} \le \frac{s_1^2}{s_2^2} f_{\alpha/2,n_2-1,n_1-1}$ where $f_{1-\alpha/2,n_2-1,n_1-1} = \frac{1}{f_{\alpha/2,n_1-1,n_2-1}}$
.9	Difference in two proportions of two binominal parameters $p_1 - p_2$	$\hat{p}_1 - \hat{p}_2$	$\hat{p}_1 - \hat{p}_2 - z_{\alpha/2} \sqrt{\frac{\hat{p}_1(1 - \hat{p}_1)}{n_1} + \frac{\hat{p}_2(1 - \hat{p}_2)}{n_2}}$ $\leq p_1 - p_2 \leq \hat{p}_1 - \hat{p}_2 + z_{\alpha/2} \sqrt{\frac{\hat{p}_1(1 - \hat{p}_1)}{n_1} + \frac{\hat{p}_2(1 - \hat{p}_2)}{n_2}}$