Estimation with confidence intervals

Confidence interval for μ		
Sample	σ **known**	σ **unknown**
Large sample	$P\{\overline{X} - z_{\alpha/2}\frac{\sigma}{\sqrt{n}} \leq \mu \leq \overline{X} + z_{\alpha/2}\frac{\sigma}{\sqrt{n}}\} = 1-\alpha$	$P\{\overline{X} - z_{\alpha/2}\frac{S}{\sqrt{n}} \leq \mu \leq \overline{X} + z_{\alpha/2}\frac{S}{\sqrt{n}}\} = 1-\alpha$
Small sample	$P\{\overline{X} - z_{\alpha/2}\frac{\sigma}{\sqrt{n}} \leq \mu \leq \overline{X} + z_{\alpha/2}\frac{\sigma}{\sqrt{n}}\} = 1-\alpha$	$P\{\overline{X} - t_{\alpha/2}\frac{S}{\sqrt{n-1}} \leq \mu \leq \overline{X} + t_{\alpha/2}\frac{S}{\sqrt{n-1}}\} = 1-\alpha$ $P\{\overline{X} - t_{\alpha/2}\frac{\hat{S}}{\sqrt{n}} \leq \mu \leq \overline{X} + t_{\alpha/2}\frac{\hat{S}}{\sqrt{n}}\} = 1-\alpha$ $df = n-1$

Confidence interval for σ^2	
Large sample	$P\{S - z_{\alpha/2}\frac{S}{\sqrt{2n}} \leq \sigma \leq S + z_{\alpha/2}\frac{S}{\sqrt{2n}}\} = 1-\alpha$
Small sample	$P\{\frac{nS^2}{\chi^2_{\frac{1}{2}\alpha}} < \sigma^2 \leq \frac{nS^2}{\chi^2_{1-\frac{1}{2}\alpha}}\} = 1-\alpha$ $P\{\frac{(n-1)\hat{S}^2}{\chi^2_{\frac{1}{2}\alpha}} < \sigma^2 \leq \frac{(n-1)\hat{S}^2}{\chi^2_{1-\frac{1}{2}\alpha}}\} = 1-\alpha$ $df = n-1$

Confidence interval for p	
Large sample	$P\{p - z_{\alpha/2}\sqrt{\frac{pq}{n}} \leq p' \leq p + z_{\alpha/2}\sqrt{\frac{pq}{n}}\} = 1-\alpha$

Confidence level (Normal distribution)

$\Phi(z)$	0,9	0,95	0,975	0,99	0,995
z	1,28	1,64	1,96	2,33	2,58