# Parameter estimators

| distribution | parameter | point estimator | confidence intervals | | | note |
|---|---|---|---|---|---|---|
| | | | two-sided | left-sided | right-sided | |
| $N(\mu, \sigma^2)$ | $\mu$ | $\bar{x}$ | $\bar{x} - t_{1-\alpha/2}(\nu) \cdot \frac{s}{\sqrt{n}} < \mu < \bar{x} + t_{1-\alpha/2}(\nu) \cdot \frac{s}{\sqrt{n}}$ | $\bar{x} - t_{1-\alpha}(\nu) \cdot \frac{s}{\sqrt{n}}$ | $\bar{x} + t_{1-\alpha}(\nu) \cdot \frac{s}{\sqrt{n}}$ | $\nu = n - 1$<br>pro $\nu > 30$ : $t_P(\nu) \approx u_P$ |
| | $\sigma^2$ | $s^2$ | $\frac{(n-1) \cdot s^2}{\chi^2_{1-\alpha/2}(\nu)} < \sigma^2 < \frac{(n-1) \cdot s^2}{\chi^2_{\alpha/2}(\nu)}$ | $\frac{(n-1) \cdot s^2}{\chi^2_{1-\alpha}(\nu)}$ | $\frac{(n-1) \cdot s^2}{\chi^2_{\alpha}(\nu)}$ | $\nu = n - 1$<br>for $\nu > 30$ :<br>$\chi^2_P(\nu) \approx 0,5\,(u_P + \sqrt{2\nu - 1})^2$ |
| arbitrary | $\mu$ | $\bar{x}$ | $\bar{x} - u_{1-\alpha/2} \cdot \frac{s}{\sqrt{n}} < \mu < \bar{x} + u_{1-\alpha/2} \cdot \frac{s}{\sqrt{n}}$ | $\bar{x} - u_{1-\alpha} \cdot \frac{s}{\sqrt{n}}$ | $\bar{x} + u_{1-\alpha} \cdot \frac{s}{\sqrt{n}}$ | for large n<br>$n \geq u^2_{1-\alpha/2} \cdot \frac{s^2}{\Delta^2}$ |
| $A(\pi)$ | $\pi$ | p | $p - u_{1-\alpha/2} \cdot \sqrt{\frac{p(1-p)}{n}} < \pi < p + u_{1-\alpha/2} \cdot \sqrt{\frac{p(1-p)}{n}}$ | $p - u_{1-\alpha} \cdot \sqrt{\frac{p(1-p)}{n}}$ | $p + u_{1-\alpha} \cdot \sqrt{\frac{p(1-p)}{n}}$ | for n : $n\hat{\pi}(1-\hat{\pi}) > 9$<br>$n \geq u^2_{1-\alpha/2} \cdot \frac{p(1-p)}{\Delta^2}$ |