**FORMLER** VT2013

Räkneregler för väntevärden och varianser (*a*, *b* och *c* är konstanter och *X* och *Y* är stokastiska variabler)

|  |  |
| --- | --- |
| $$E\left(c\right)=c$$ | $$V\left(c\right)=0$$ |
| $$E\left(X+c\right)=E\left(X\right)+c$$ | $$V\left(X+c\right)=V(X)$$ |
| $$E\left(aX\right)=aE(X)$$ | $$V\left(aX\right)=a^{2}V(X)$$ |
| $$E\left(aX+bY+c\right)=aE\left(X\right)+bE\left(Y\right)+c$$ | $$V\left(aX+bY+c\right)=a^{2}V\left(X\right)+b^{2}V\left(Y\right)+2abCov\left(X,Y\right)$$ |

Ändlighetskorrektion: $\frac{N-n}{N-1}$

Stickprovsvarians: $s^{2}=\frac{1}{n-1}\sum\_{i=1}^{n}\left(x\_{i}-\overbar{x}\right)^{2}=\frac{1}{n-1}\left(\sum\_{i=1}^{n}x\_{i}^{2}-n\overbar{x}^{2}\right)$

Stickprovskovarians: $s\_{xy}=\sum\_{i=1}^{n}\left(x\_{i}-\overbar{x}\right)\left(y\_{i}-\overbar{y}\right)=\frac{1}{n-1}\left(\sum\_{i=1}^{n}x\_{i}y\_{i}-n\overbar{x}\overbar{y}\right)$

Binomialfördelningen: $f\left(x\right)=\left(\begin{matrix}n\\x\end{matrix}\right)p^{x}(1-p)^{n-x}=\frac{n!}{x!\left(n-x\right)!}p^{x}(1-p)^{n-x}$

Poissonfördelningen: $f\left(x\right)=\frac{λ^{x}e^{-λ}}{x!}$

Diverse konfidensintervall och enkelsidiga testvariabler (*f.g.* = frihetsgrader):

|  |  |  |
| --- | --- | --- |
| $$\overbar{x}\pm z\_{α/2}\frac{σ}{\sqrt{n}}$$ |  | $$Z=\frac{\overbar{X}-μ\_{0}}{σ/\sqrt{n}}\geq z\_{α}$$ |
| $$\overbar{x}\pm t\_{α/2}^{(f.g.)}\frac{s}{\sqrt{n}}$$ |  | $$T=\frac{\overbar{X}-μ\_{0}}{S/\sqrt{n}}\geq t\_{α}^{(f.g.)}$$ |
| $$\overbar{x}\pm z\_{α/2}\frac{s}{\sqrt{n}}$$ |  | $$Z=\frac{\overbar{X}-μ\_{0}}{S/\sqrt{n}}\geq z\_{α}$$ |
| $$\overbar{x}\_{1}-\overbar{x}\_{2}\pm z\_{α/2}\sqrt{\frac{σ\_{1}^{2}}{n\_{1}}+\frac{σ\_{2}^{2}}{n\_{2}}}$$ |  | $$Z=\frac{\overbar{X}\_{1}-\overbar{X}\_{2}-0}{\sqrt{{σ\_{1}^{2}}/{n\_{1}}+{σ\_{2}^{2}}/{n\_{2}}}}\geq z\_{α}$$ |
| $$\overbar{x}\_{1}-\overbar{x}\_{2}\pm t\_{α/2}^{(f.g.)}∙s\_{p}\sqrt{\frac{1}{n\_{1}}+\frac{1}{n\_{2}}}$$ |  | $$T=\frac{\overbar{X}\_{1}-\overbar{X}\_{2}-0}{S\_{p}\sqrt{{1}/{n\_{1}}+{1}/{n\_{2}}}}\geq t\_{α}^{(f.g.)}$$ |
| $$s\_{p}^{2}=\frac{\left(n\_{1}-1\right)s\_{1}^{2}+\left(n\_{2}-1\right)s\_{2}^{2}}{n\_{1}+n\_{2}-2}$$ |
| $$\overbar{x}\_{1}-\overbar{x}\_{2}\pm z\_{α/2}\sqrt{\frac{s\_{1}^{2}}{n\_{1}}+\frac{s\_{2}^{2}}{n\_{2}}}$$ |  | $$Z=\frac{\overbar{X}\_{1}-\overbar{X}\_{2}-0}{\sqrt{{S\_{1}^{2}}/{n\_{1}}+{S\_{2}^{2}}/{n\_{2}}}}\geq z\_{α}$$ |

Forts. konfidensintervall och enkelsidiga testvariabler (*f.g.* = frihetsgrader):

|  |  |  |
| --- | --- | --- |
| $$\overbar{d}\pm t\_{α/2}^{(f.g.)}\frac{s\_{d}}{\sqrt{n}}$$ |  | $$T=\frac{\overbar{D}-0}{S\_{D}/\sqrt{n}}\geq t\_{α}^{(f.g.)}$$ |
|  |  |  |
| $$\frac{y}{n}\pm z\_{α/2}\sqrt{\left(y/n\right)(1-y/n)/n}$$ |  | $$Z=\frac{Y/n-π\_{0}}{\sqrt{π\_{0}(1-π\_{0})/n}}\geq z\_{α}$$ |
| $$\hat{p}\_{1}-\hat{p}\_{2}\pm z\_{α/2}\sqrt{\frac{\hat{p}\_{1}(1-\hat{p}\_{1})}{n\_{1}}+\frac{\hat{p}\_{2}(1-\hat{p}\_{2})}{n\_{2}}}$$ |  | $$Z=\frac{Y\_{1}/n\_{1}-Y\_{2}/n\_{2}-0}{\sqrt{\left(\frac{Y\_{1}+Y\_{2}}{n\_{1}+n\_{2}}\right)\left(1-\frac{Y\_{1}+Y\_{2}}{n\_{1}+n\_{2}}\right)\left(\frac{1}{n\_{1}}+\frac{1}{n\_{2}}\right)}}\geq z\_{α}$$ |
|  |  |  |
|  |  | $$χ^{2}=\sum\_{}^{}\frac{(n\_{i}-nπ\_{i})^{2}}{nπ\_{i}}\geq χ\_{α}^{2}(f.g.)$$ |
|  |  | $$χ^{2}=\sum\_{}^{}\sum\_{}^{}\frac{(n\_{ij}-n\_{i∙}n\_{∙j}/n)^{2}}{n\_{i∙}n\_{∙j}/n}\geq χ\_{α}^{2}(f.g.)$$ |