**Distributions**

, and 

 

; e.g.: 

, if  → ; 

 

**Linear regression**

$Y=β\_{0}+βx=α+β(x-\overbar{x})$ $β\_{0}=α+β\overbar{x}$

$\hat{Y}=b\_{0}+bx=a+b(x-\overbar{x})$ $b\_{0}=a-b\overbar{x}$



  

  





Confidence interval for the slope: Prediction interval for Y at x:

$P\left(b-t\_{\frac{α}{2}}s\_{b}<β<b+t\_{\frac{α}{2}}s\_{b}\right)=1-α$ $P\left(\hat{Y}-t\_{\frac{α}{2}}s\_{y^{\*}-\hat{Y}}<y^{\*}<\hat{Y}+t\_{\frac{α}{2}}s\_{y^{\*}-\hat{Y}}\right)=1-α$

Confidence interval for Y at x:

$$P\left(\hat{Y}-t\_{\frac{α}{2}}s\_{\hat{Y}}<Y<\hat{Y}+t\_{\frac{α}{2}}s\_{\hat{Y}}\right)=1-α$$

**Design of experiments – Factorial models**

   