V Binomial

Montag, 2. Mai 2022 10:53

Ü Binomial / Hypergeom

a) ZmZ → Binomialverteilung

Stichprobe (Bernoullikette) hat Länge $n=2$ (NICHT $n=60$)

$k=2$. $p=\frac{6}{60}=0.1$

$P(\underset{\substack{\uparrow\\k}}{X=2})=\binom{n}{k}p^k(1-p)^{n-k}$

$=\binom{2}{2}0.1^2 = 0.01 = 1\%$

b) ZoZ → Hypergeom. Vert. $N=60$, $S=6$

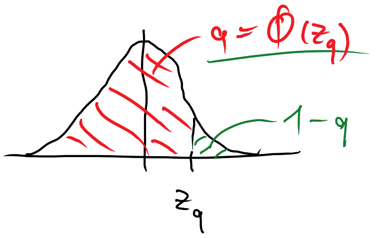
$n=2$, $k=2$

$P(X=2)=\frac{\binom{6}{2}\binom{54}{0}}{\binom{60}{2}}=0.847\% = \underline{\underline{\frac{6}{60}\cdot\frac{5}{59}}}$

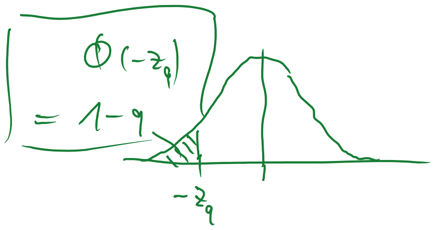
Wg $N \gg n$, also $60 \gg 2$ ist 1% (binomial) ganz gute Näherung 0.847%

Erläuterungen zu "Regeln für Normalverteilungen" (S 10-12)

Nr. 5 $\quad q = \Phi(z_q) \Leftrightarrow 1 - \underset{\Phi(z_q)}{\underset{\parallel}{q}} = \Phi(-z_q)$



$\Longrightarrow$ Nr. 1. $\quad \Phi(-z) = 1 - \Phi(z)$



Nr. 3: $\quad F(b) = P(X \leq b) = P\Big(\underbrace{\frac{X-\mu}{\sigma}}_{= Z \text{ (Nr. 2)}} \leq \frac{b-\mu}{\sigma}\Big) = P\Big(Z \leq \frac{b-\mu}{\sigma}\Big)$

standard normal verteilt

$= \Phi\Big(\frac{b-\mu}{\sigma}\Big)$

1.1 Normalverteilung

$P(X > 2.0) = 1 - P(X \leq 2.0)$

$= 1 - P\Big(\frac{X-\mu}{\sigma} \leq \frac{2.0-\mu}{\sigma}\Big)$

$= 1 - P\Big(Z \leq \frac{2.0-\mu}{\sigma}\Big)$ $\qquad Z$ stand. norm. vert.

$= 1 - \Phi\Big(\frac{2.0-\mu}{\sigma}\Big)$

$= 1 - \Phi(1.25)$

$\overset{\text{Tab.}}{=} 1 - 0.8944 = 0.1056$

10.56% der Menschen sind > 2 m