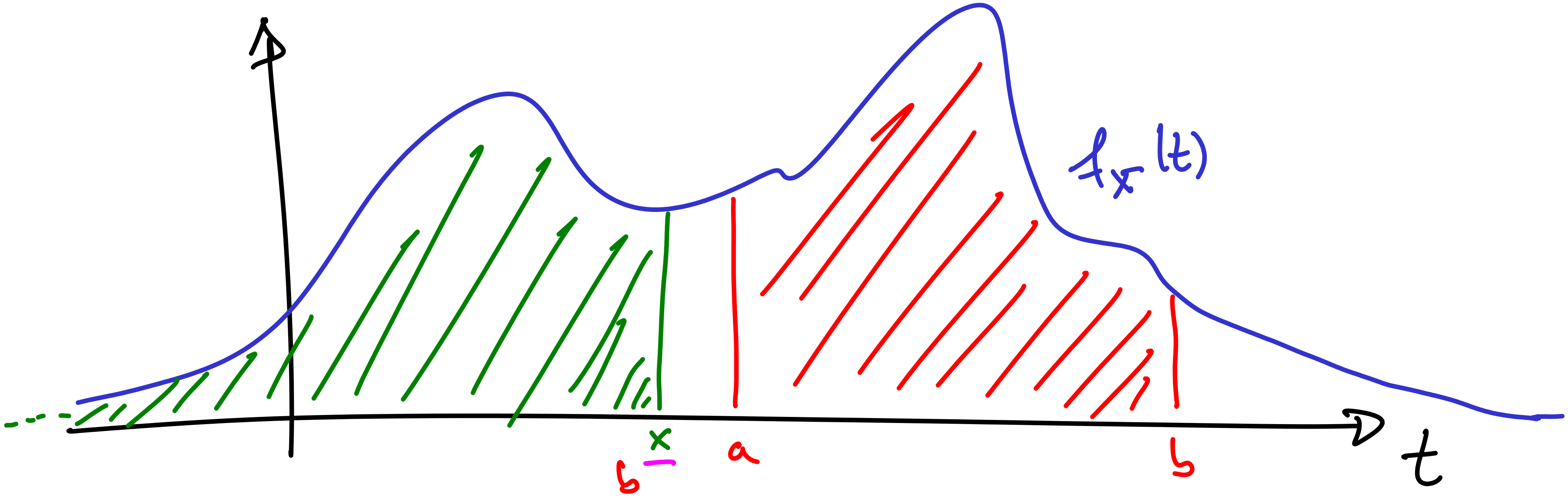
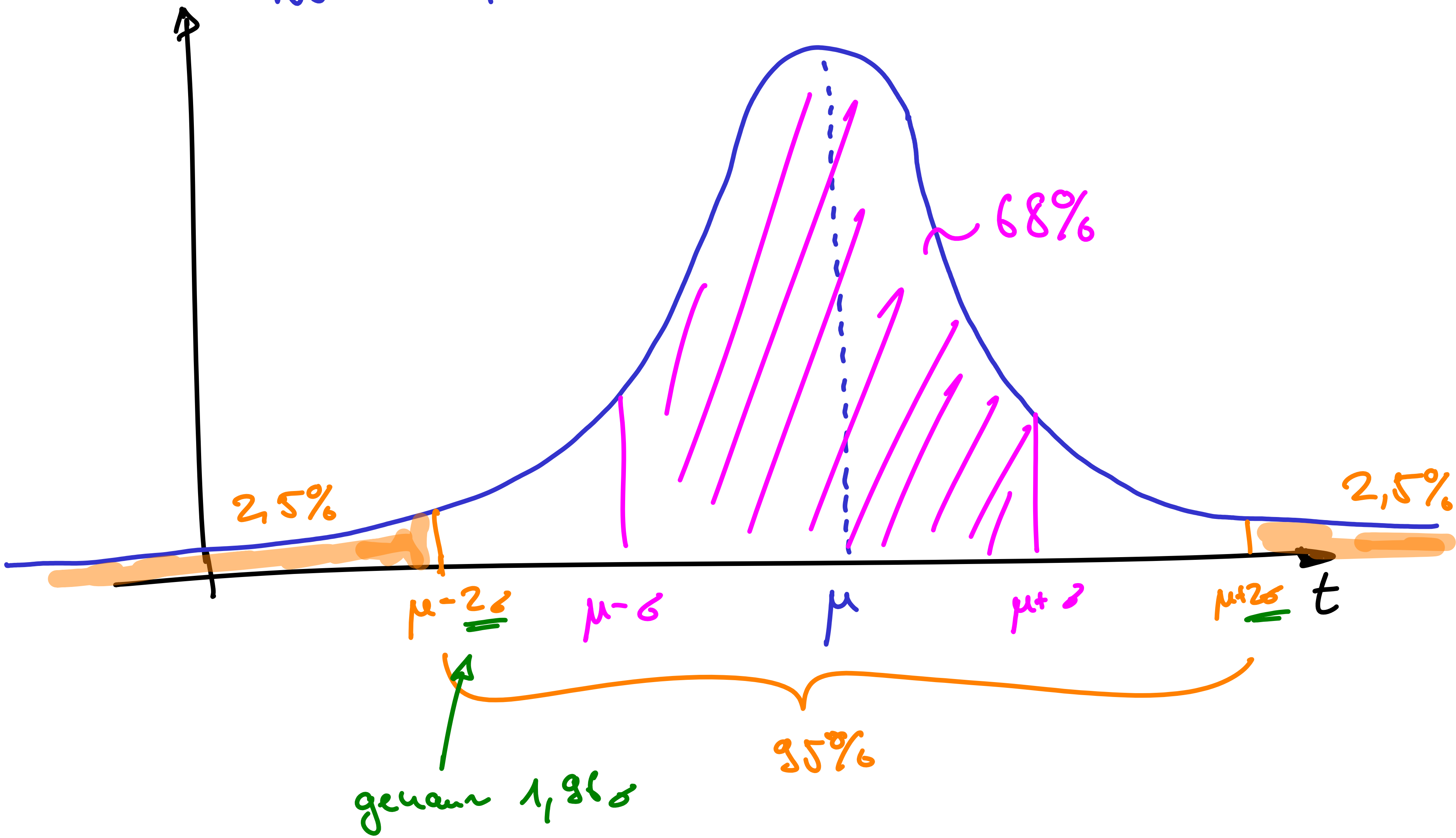


$$\mathbb{P}[a \le X \le b] = \int_a^b f_X(t)\,dt = F_X(b) - F_X(a)$$

$$F_X(x) = \int_{-\infty}^{x} f_X(s)\,ds = \mathbb{P}[X \le x]$$

$$F_X(\text{med}) = \int_{-\infty}^{\text{med}} f_X(t)\,dt = \frac{1}{2}$$

Normalvert.



$$X \sim N(2, 5)$$

μ σ^2

Standardisiere:

$$Z = \frac{X-\mu}{\sigma} = \frac{X-2}{\sqrt{5}}$$

$$Z \sim N(0,1)$$

$$P[X \geq 7] = P[\mu + \sigma Z \geq 7] = P[2 + \sqrt{5} Z \geq 7]$$

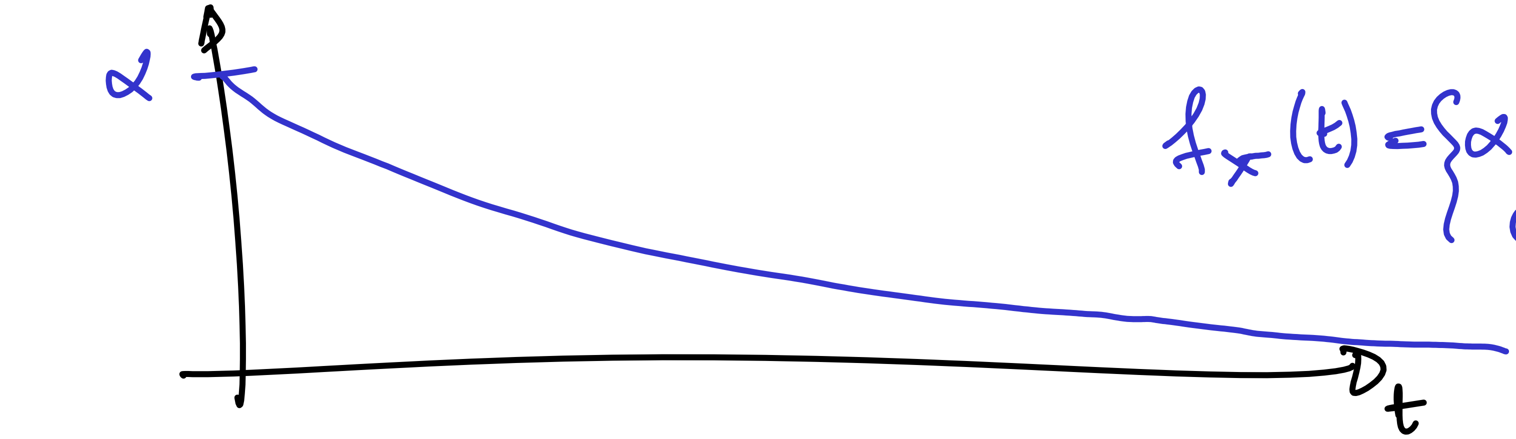
$$= P[\sqrt{5} Z \geq 5] = P[Z \geq \sqrt{5}]$$

$$= 1 - P[Z < \sqrt{5}] = 1 - \text{normcdf}(\text{sqrt}(5))$$

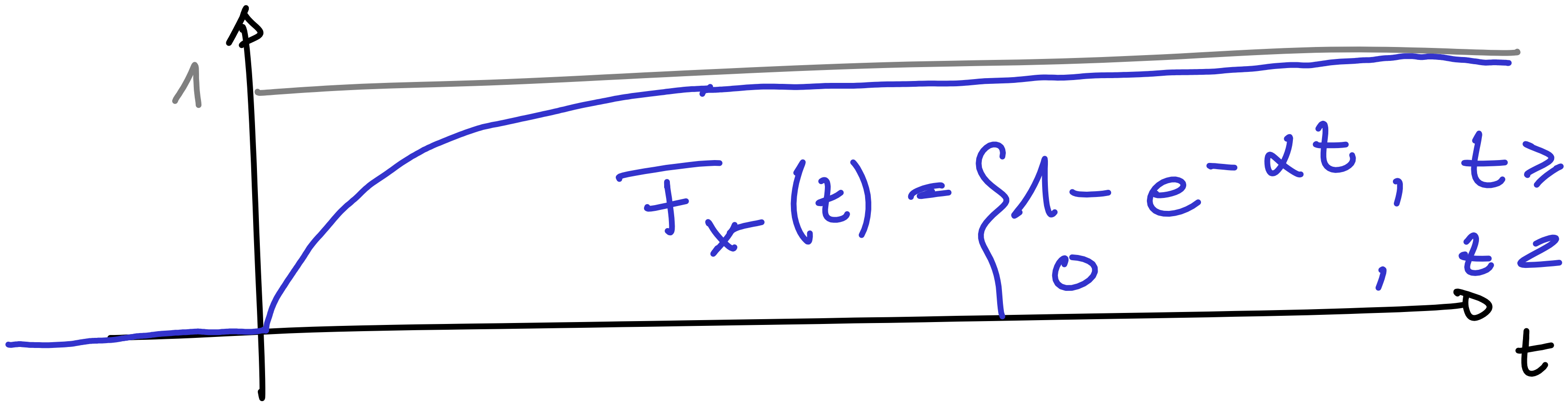
$$= 1 - \Phi(\sqrt{5})$$

$$\approx 1{,}27\%$$

Exponentialverteilung

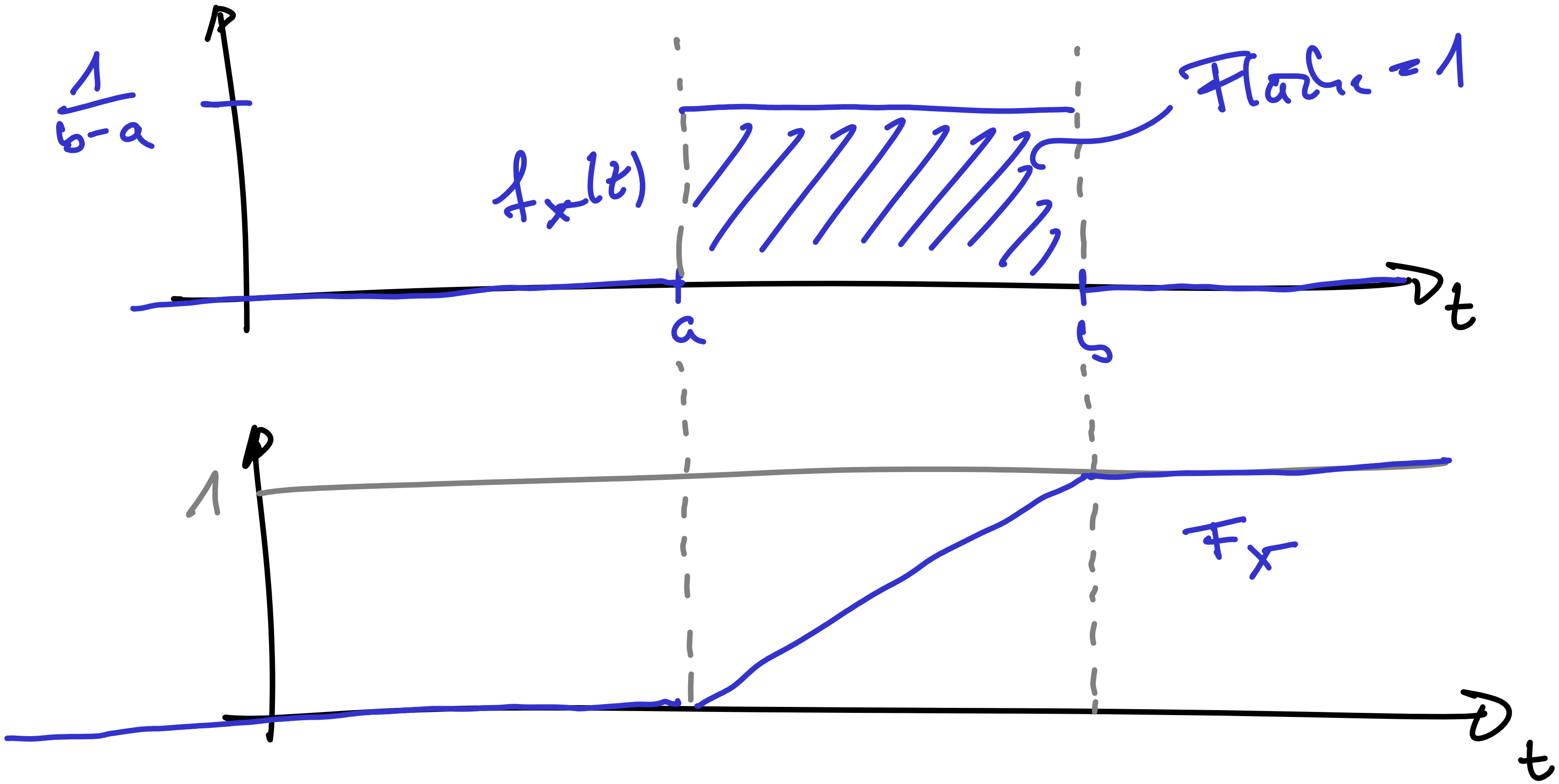


$$f_X(t) = \begin{cases} \alpha\, e^{-\alpha t} & , t \geq 0 \\ 0 & , t < 0 \end{cases}$$



$$F_X(t) = \begin{cases} 1 - e^{-\alpha t} & , t \geq 0 \\ 0 & , t < 0 \end{cases}$$

Gleichverteilung



Bsp. zum ZGS

z.Z. $\mathrm{Bin}(n,p) \approx N(np, np(1-p))$, $n \to \infty$

$X_1, X_2, \ldots, X_n \sim \mathrm{Bin}(1,p)$

immer

$Y = X_1 + X_2 + \ldots + X_n \sim \mathrm{Bin}(n,p)$

$E[Y] = np$, $\mathrm{Var}(X) = np(1-p)$

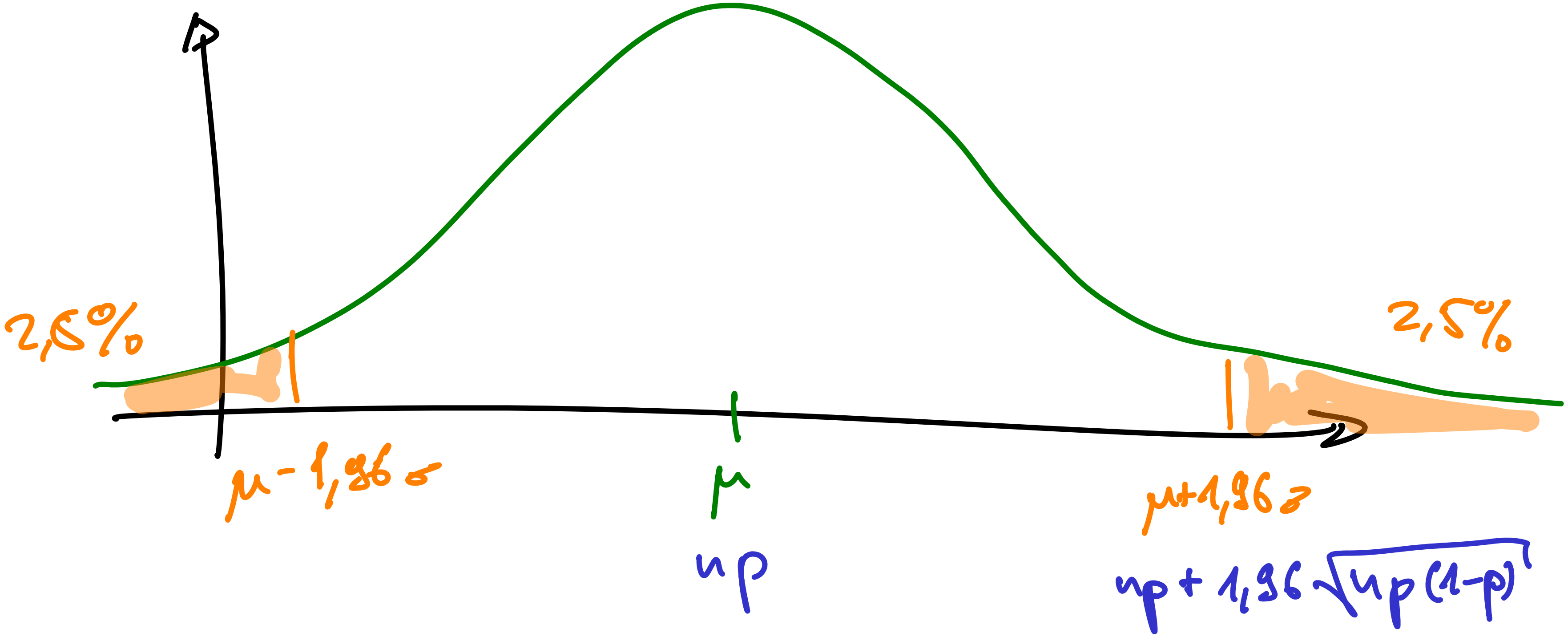
andererseits

$Y = X_1 + X_2 + \ldots + X_n \sim N(np, np(1-p))$

ZGS sagt normalverteilt für $n \to \infty$

Faustregel für Binomialtest

Teststatistik $X \sim Bin(n,p) \approx N(np, np(1-p))$



Annahmebereich auf Signifikanzniveau $\alpha = 5\%$

$$K^c = \left[np - 1{,}96\sqrt{np(1-p)}\,,\; np + 1{,}96\sqrt{np(1-p)}\right]$$

enthält ca. 95% der Werte/Ergebnisse