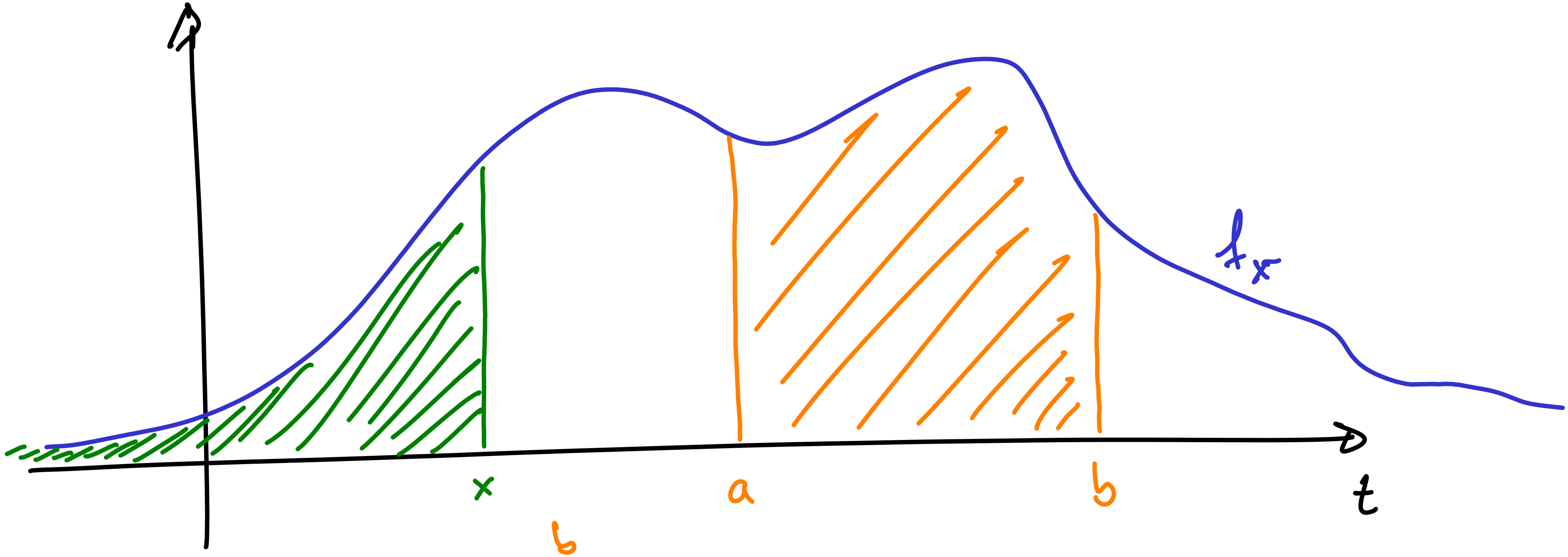
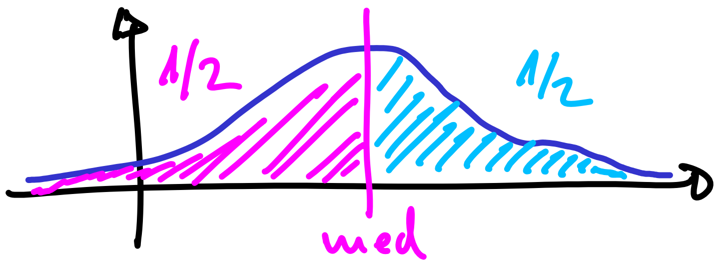
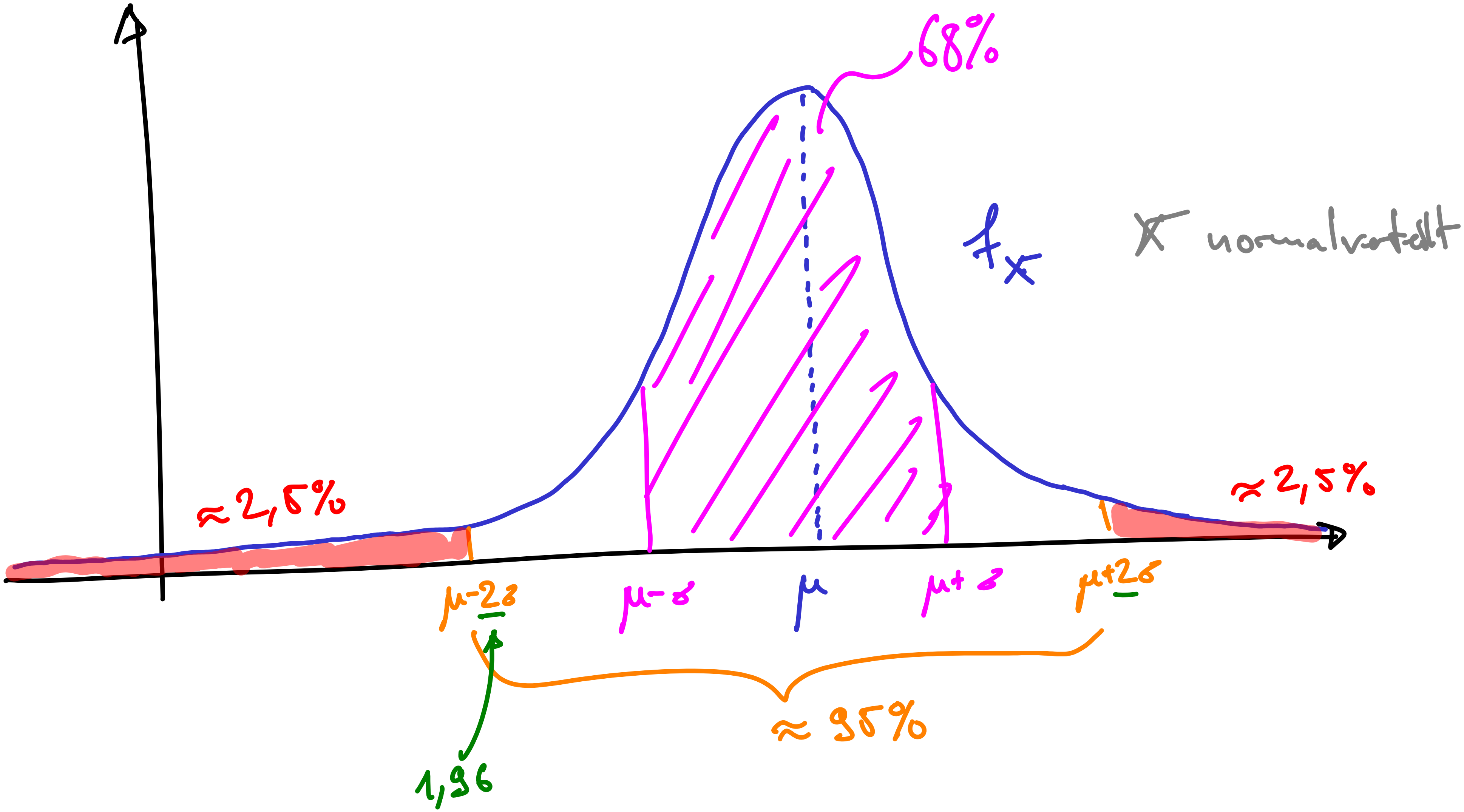



$$P[a \le X \le b] = \int_a^b f_X(t)\,dt$$

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




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


68%
$f_X$
X normalvertelt
≈ 2,5%
≈ 2,5%
$\mu - 2\sigma$
$\mu - \sigma$
$\mu$
$\mu + \sigma$
$\mu + 2\sigma$
≈ 95%
1,96

$$X \sim N(\underset{\mu}{2}, \underset{\sigma^2}{5})$$

Standardisieren

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

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

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

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

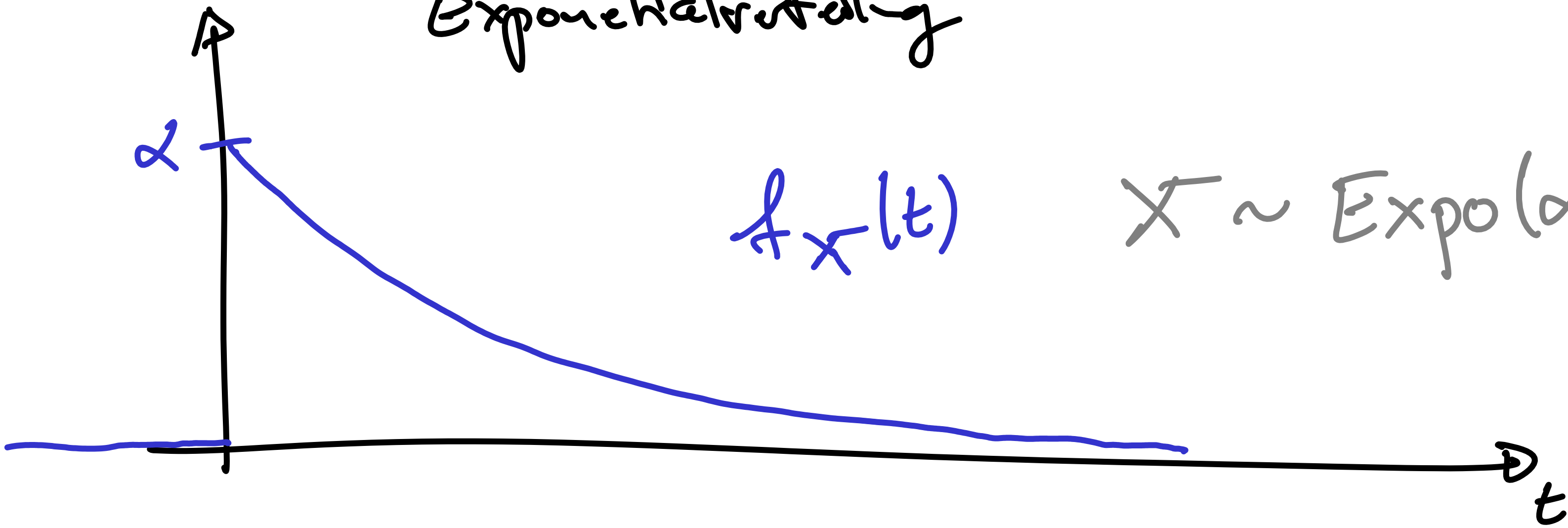
$$= 1 - P[Z < \sqrt{5}]$$

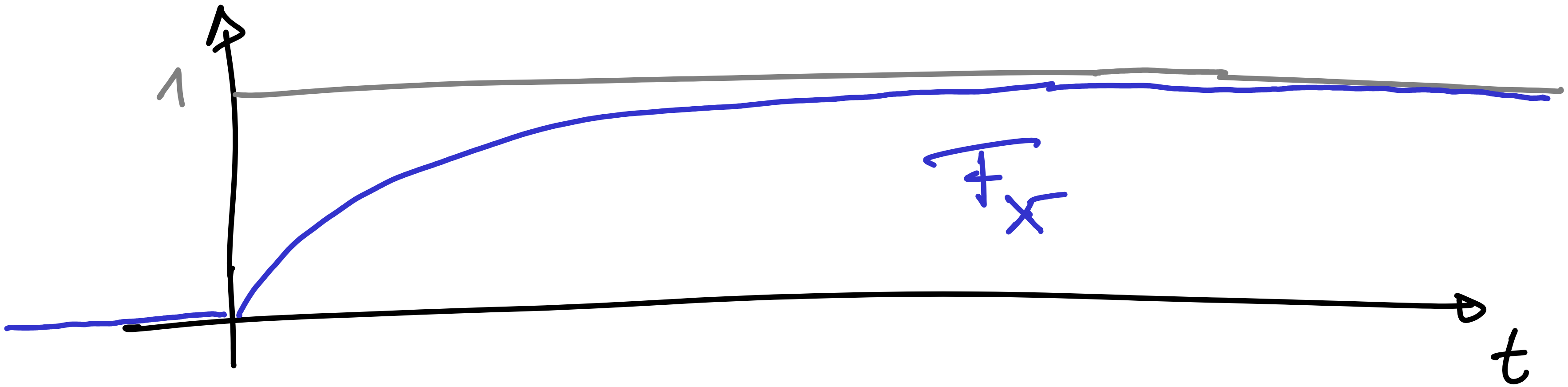
= 1 − normcdf(sqrt(5))    MATLAB

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

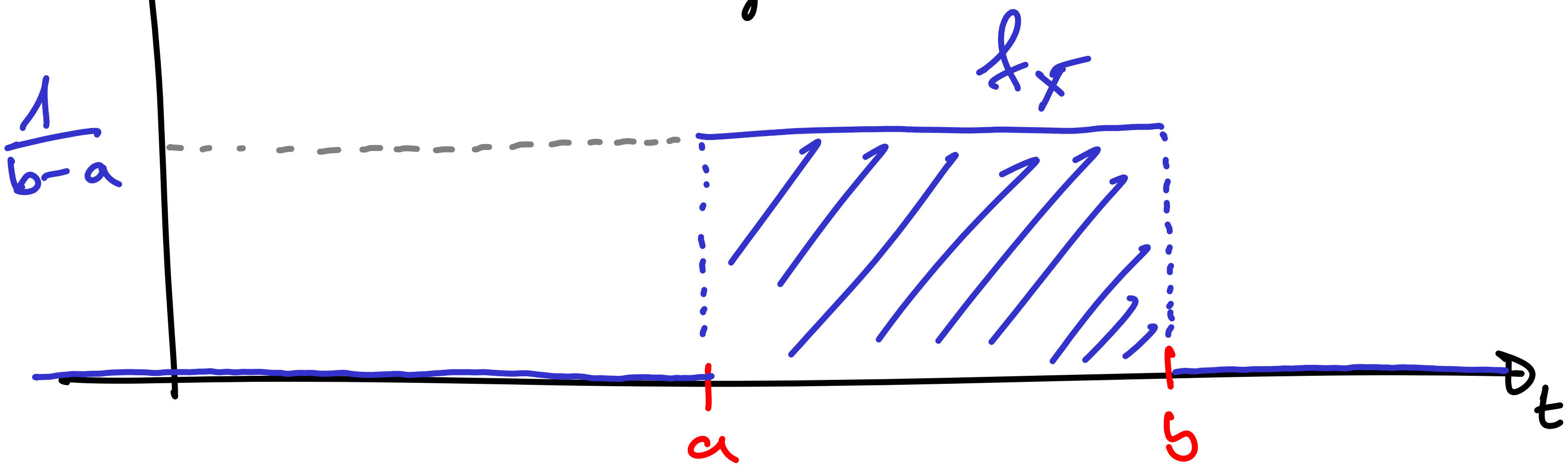
# Exponentialverteilung

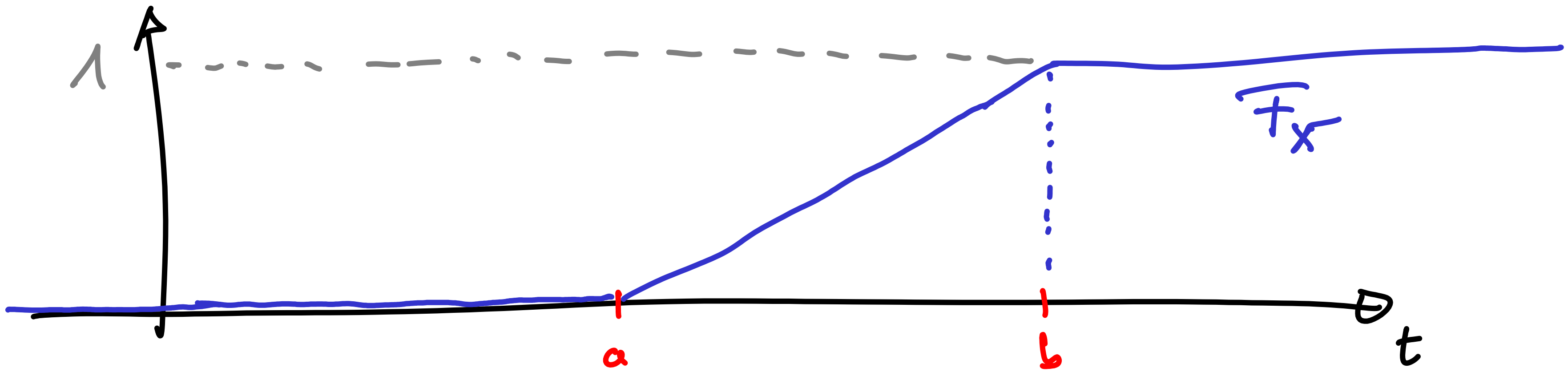
$X \sim \mathrm{Expo}(\alpha)$



# Gleichverteilung



## (a) ZGS

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

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

immer, laut Def. der Binomialvert.

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

andererseits

$Y = X_1 + \dots + X_n \underset{n\to\infty}{\sim} N(np, np(1-p))$

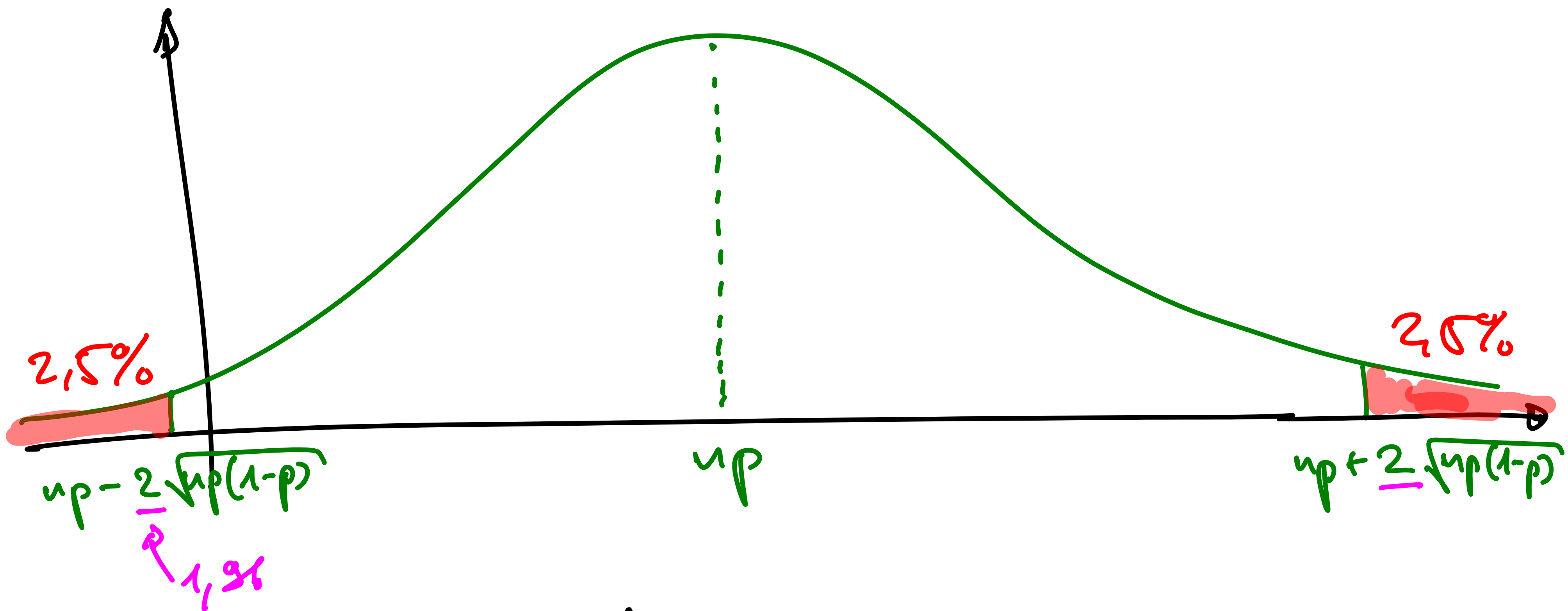
ZGS da $X_j$ iid

Parameter so, dass Erwartungswert & Varianz stimmen

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

daraus: Faustregel für Binomialtest

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




Daher Annahmebereich zu $\alpha = 5\%$

$$K^c = \left[np - 2\sqrt{np(1-p)},\ np + 2\sqrt{np(1-p)}\right]$$