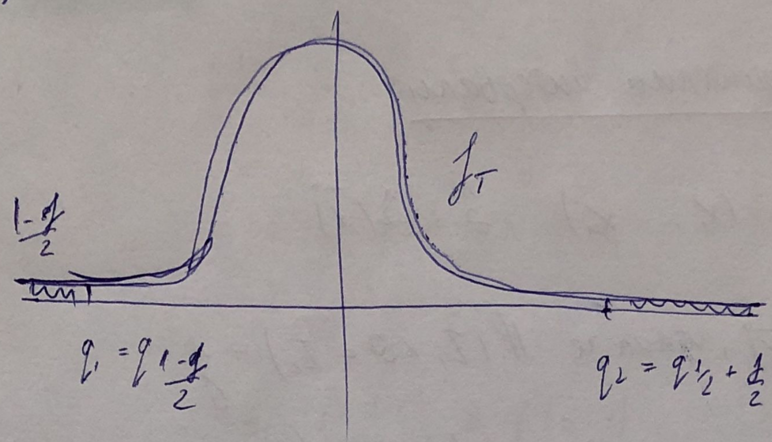
по-общо



$$\mathbb{P}(T > q_2) = \frac{1-\gamma}{2}$$

$$\mathbb{P}(T < q_1) = \frac{1-\gamma}{2}$$

$$0.95 = \gamma = \mathbb{P}(q_1 < T < q_2) = \mathbb{P}(T^{-1}(q_1) < \theta < T^{-1}(q_2))$$

$$\min_{q_1 < q_2} \{ \underbrace{|T^{-1}(q_2) - T^{-1}(q_1)|} \}$$

$$\gamma = \mathbb{P}(q_1 < T < q_2)$$

→ минимизиране дов. интерв. при фикс. ниво на доверие!

(+) $X \in N(\mu, \sigma^2)$ σ^2 е известно, т.е. $\mu = \theta$

$\hat{\mu} = \overline{X}_n = \frac{1}{n}\sum_{j=1}^{n} X_j$, то $T(\vec{X}; \mu) = \frac{\overline{X}_n - \mu}{\sigma/\sqrt{n}} \in N(0,1)$

↑

$N(\mu; \frac{\sigma^2}{n})$

T е намаляваща по μ и $\mathbb{P}(T \le x) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{x} e^{\frac{-y^2}{2}} dy$

$\Rightarrow T$. е ц.с за μ

$$\gamma = \mathbb{P}(-q < T < q) = \mathbb{P}\left(-q_{\frac{1}{2}+\frac{\gamma}{2}} < \frac{\overline{X}_n - \mu}{\sigma/\sqrt{n}} < q_{\frac{1}{2}+\frac{\gamma}{2}}\right)$$

~~(+) $X \in N(\mu, \sigma^2)$~~

$$\Rightarrow \mathbb{P}\left(\mu \in \left(\overline{X}_n - q_{\frac{1}{2}+\frac{\gamma}{2}} \frac{\sigma}{\sqrt{n}}, \overline{X}_n + q_{\frac{1}{2}+\frac{\gamma}{2}} \frac{\sigma}{\sqrt{n}}\right)\right) = \gamma$$

$$I_1 = \overline{X}_n - q_{\frac{1}{2}+\frac{\gamma}{2}} \frac{\sigma}{\sqrt{n}}; \quad I_2 = \overline{X}_n + q_{\frac{1}{2}+\frac{\gamma}{2}} \frac{\sigma}{\sqrt{n}})$$