31/10 Ex andel def. kreditkort

X = antal def. kreditkort

$X \in Hyp(800.000, 16000, p) \approx Bin(16000, p) \approx N(np, \sqrt{np(1-p)})$

p^* = skattning av $p \left(= \frac{x}{n}\right)$, andel def

$p \in (a, b)$, 95% säkerhet (99%, 99,9%)

Hypotesprröv.

$H_0: p \leq 0{,}5\%$

$H_1: p > 0{,}5\%$

Ex lastning av malm.

X_i = tid för lastning av en vagn

- Antag att $X_i \in N(\mu; \sigma) \longrightarrow \mu^* = \bar{X} \in N(\mu; \frac{\sigma}{\sqrt{n}})$

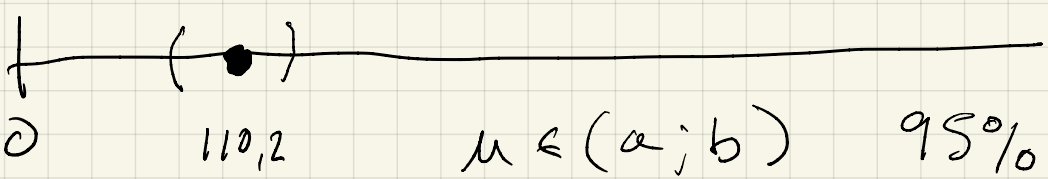
μ - förväntad tid för att lasta en vagn.

$\mu^* = \bar{x} = 110{,}2\,s \qquad \sigma^* = s = 23{,}7\,s$

- Antag att $X_i \in \bullet(\mu, \sigma) \longrightarrow \mu^* = \bar{X} \approx N(\mu; \frac{\sigma}{\sqrt{n}})$

okänd CGS

$\mu > 0$

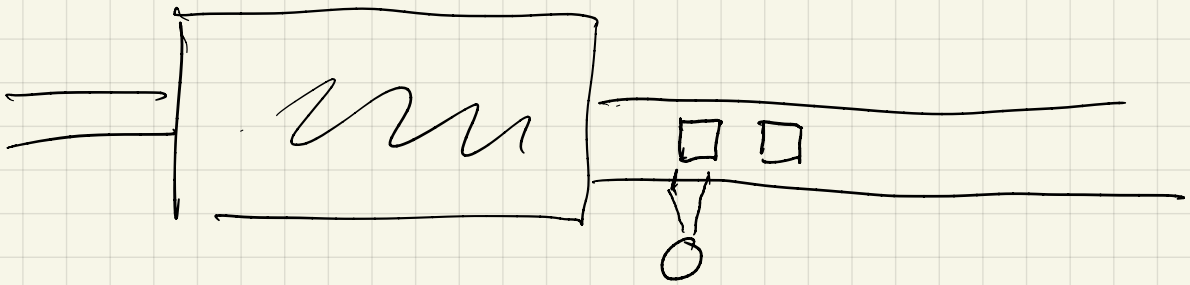


$\mu \in (a; b)$ 95% säkerhet (99%, 99.9%)

$H_0: \mu = \mu_0$ $\quad H_1: \mu < \mu_0 \quad \left(\begin{cases} \mu \neq \mu_0 \\ \mu < \mu_0 \\ \mu > \mu_0 \end{cases} \right)$ motHypotes

Nollhypotes

Ex Man tillverkar kvadratiska plattor



X_i = en sida i en kvadrat (cm)

$X_i \in \bullet(\mu; \sigma)$ μ - väntevärdet

Hur skattar man arean, μ^2, på bästa sätt

$$(\mu^2)_1^* = \bar{X}^2 \quad \text{(stickprovsmedel i kvadrat)}$$

$$(\mu^2)_2^* = \frac{1}{n}\sum X_i^2 \quad \text{[medel av kvadrterna)}$$

$$(\mu^2)_3^* = \frac{X_1X_2 + X_3X_4 + \ldots + X_{n-1}X_n}{n/2}$$

Stickprov $X_1, \dots, X_n$ oberoende stokvar.

$E(X_i) = \mu \qquad V(X_i) = \sigma^2$

$$E\left[(\mu^2)_1^*\right] = E(\bar{X}^2) = \left[V(\bar{X}) = \frac{\sigma^2}{n} = E(\bar{X}^2) - (\underbrace{E(\bar{X})}_{\mu^2})^2 \right.$$

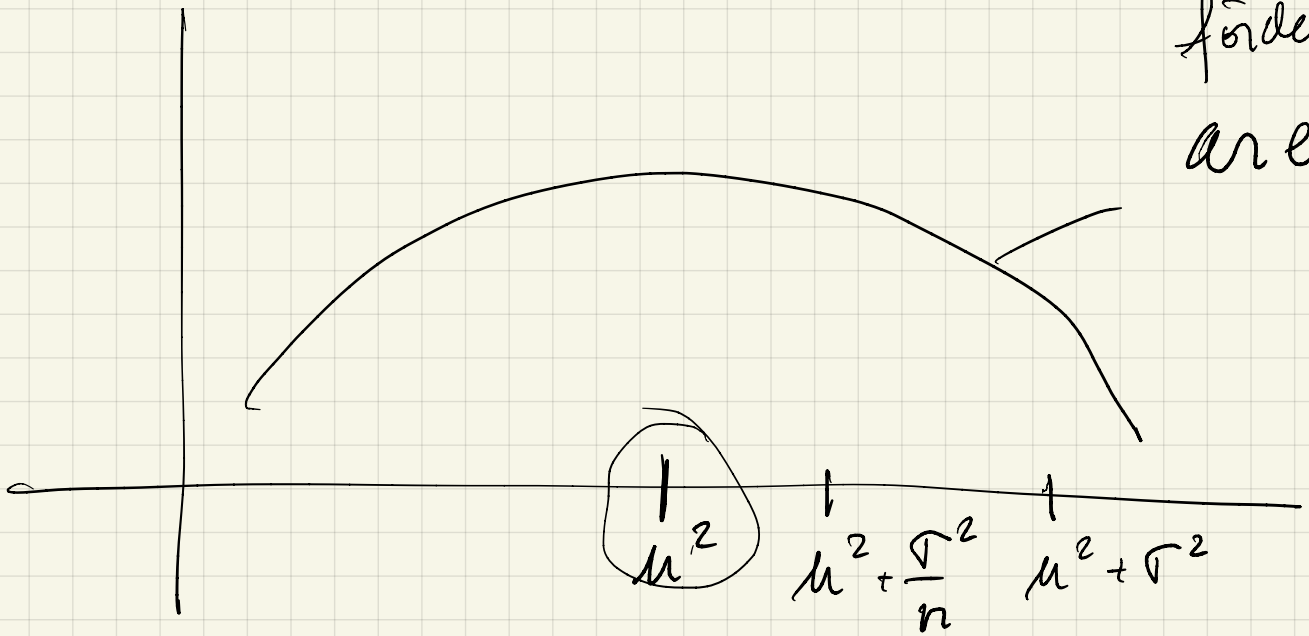
$$\left. \frac{\sigma^2}{n} = E(\bar{X}^2) - \mu^2 \right] = \mu^2 + \frac{\sigma^2}{n}$$

$$E((\mu^2)_2^*) = E\left(\frac{1}{n}\sum_1^n X_i^2\right) = \frac{1}{n}\sum E(X_i^2) =$$

$$= \left[V(X_i) = \sigma^2 = E(X_i^2) - \mu^2 \right] = \mu^2 + \sigma^2$$

$$E((\mu^2)_3^* = E\left(\frac{X_1X_2 + \dots X_{n-1}X_n}{n/2}\right) = \frac{2}{n}\left(\overbrace{E(X_1)E(X_2) + \dots + E(X_{n-1})E(X_n)}^{n/2 \text{ st}}\right)$$

$$= \frac{2}{n}\left(\underbrace{\mu \cdot \mu + \mu \cdot \mu + \dots + \mu \cdot \mu}_{n/2 \text{ st}}\right) = \mu^2 \text{ V. V. R.}$$

fördelningen för

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