UKE 35:

UKE 36:

Oppgave 6.4.4.

a) $t_0 = 1.895$.
b) $t_0 = 1.895$.

Oppgave 6.4.10.

$$\Pr\{a < S^2/\sigma^2 < b\} = \Pr\{\chi^2_{n-1} < (n-1)b\} - \Pr\{\chi^2_{n-1} < (n-1)a\}.$$

Oppgave 3.

b) $\hat{p} = 0.80$ og $[0.77,\ 0.88]$ er et tilnærmet 0.90 konfidensintervall for p.
c) $n \geq 400 z^2_{1-\alpha/2}$, (Hint: $\hat{p}(1-\hat{p}) \leq 1/4$).
d) $\big[[2n\hat{p} + z^2 - c]/[2(n+z^2)],\ [2n\hat{p} + z^2 + c]/[2(n+z^2)]\big]$, hvor $c = z(z^2 + 4n\hat{p}(1-\hat{p}))^{1/2}$ og $z = z_{1-\alpha/2}$.

UKE 37:

Oppgave 8.10.6.

a) $\text{lik}(p|\text{data}) = \binom{n}{x} p^x (1-p)^{n-x}, \quad \frac{d}{dp} l(p|\text{data}) = \frac{x}{p} - \frac{n-x}{1-p} = 0 \quad \Rightarrow \quad \hat{p} = \frac{x}{n}.$
b) Du skal få at $l(p)$, hvor $0 \leq p \leq 1$, har toppunkt i $p = 1/2$.

UKE 38:

Oppgave 8.10.19.

La $X_1, \ldots, X_n$ være uif., hvor $X_i \sim N(\mu, \sigma^2)$, for $i = 1, \ldots, n$. Da er log-likelihood funksjonen gitt ved

$$l(\mu, \sigma^2|\text{data}) = -\frac{n}{2}[\log(2\pi) + \log(\sigma^2)] - \frac{1}{2\sigma^2}\sum_{i=1}^{n}(x_i - \mu)^2.$$

a) $d/d\sigma^2\ l(\sigma^2|\mu, \text{data}) = -n/\sigma^2 + 1/\sigma^4 \sum_{i=1}^{n}(x_i-\mu)^2 = 0 \quad \Rightarrow \quad \hat{\sigma}^2 = 1/n\sum_{i=1}^{n}(x_i-\mu)^2.$

b) $d/d\mu\ l(\mu|\sigma^2, \text{data}) = 1/\sigma^2 \sum_{i=1}^{n}(x_i - \mu) = 0 \quad \Rightarrow \quad \hat{\mu} = \bar{X}_n.$

Oppgave 8.10.47.

La $X_1, \ldots, X_n$ være uif., hvor X_i har tetthetsfunksjon

$$f(x|x_0, \theta) = \theta x_0^\theta x^{\theta-1}, \quad \text{hvor } x \geq x_0 \ \text{ og } \ \theta > 1,$$

for $i = 1, \ldots, n$.

a) $\mu_1 = E[X] = \int_{x_0}^{\infty} x f(x|x_0,\theta)\, dx = \theta x_0/[\theta - 1] \quad \Rightarrow \quad \hat{\theta} = \hat{\mu}_1/[\hat{\mu}_1 - x_0] = \bar{X}_n/[\bar{X}_n - x_0].$

b) $d/d\theta\ l(\theta|x_0, \text{data}) = d/d\theta\left[n\log(\theta) + n\theta\log(x_0) - (\theta+1)\sum_{i=1}^{n}\log(x_i)\right] = n/\theta + n\log(x_0) - \sum_{i=1}^{n}\log(x_i) = 0 \quad \Rightarrow \quad \tilde{\theta} = n/[\sum_{i=1}^{n}\log(x_i) - n\log(x_0)].$