Vink til statistik opgavesæt 3

7.2

2 Eftervis, at $f_X(x)$ er en gammafordelingstæthed

3 $X \sim \Gamma(\frac{r}{2}, \frac{1}{2})$, jf. opg. 2

8 Iagttag, at

$$\frac{1}{\sigma} V_x, \frac{1}{\sigma} V_y, \frac{1}{\sigma} V_z \sim N(0,1) \text{ uafhængige}$$

Iagttag endvidere, at

$$U = \frac{1}{\sigma^2}(V_x^2 + V_y^2 + V_z^2) \sim \chi^2(3)$$

Angiv tæthedsfunktionen for U

Bestem tæthedsfunktionen for $V = \sigma\sqrt{U}$

7.3

9 Husk, at $\mu = \bar{x} \pm t_{1-\frac{\alpha}{2}}(n-1)\frac{s}{\sqrt{n}}$

11 Husk, at $\frac{(n-1)s^2}{\chi^2_{1-\frac{\alpha}{2}}(n-1)} \le \sigma^2 \le \frac{(n-1)s^2}{\chi^2_{\frac{\alpha}{2}}(n-1)}$

Uddrag kvadratroden

16 Testvariabel: $T = \frac{\bar{X} - \mu_0}{\frac{S}{\sqrt{n}}} \sim t(n-1)$ under H_0

Forkast for $t_{obs} > t_{1-\alpha}(n-1)$

19 Antag, at differenserne er normalfordelte

Testvariabel: $T = \frac{\bar{X}_A - \bar{X}_B - 0}{\frac{S_d}{\sqrt{n}}} \sim t(n)$ under H_0

$t_{obs} = 0,5320$

22 Testvariabel: $\underline{X}^2 = \frac{(n-1)S^2}{\sigma_0^2} \sim \chi^2(n-1)$ under H_0

Forkast for $\chi^2_{obs} > \chi^2_{1-\alpha}(n-1)$

7.4

25 Testvariabel. $T = \dfrac{\bar{X}_A - \bar{X}_B - 0}{S_p\sqrt{\frac{1}{n}+\frac{1}{m}}} \sim t(n+m-2)$ under H_0

Mellemresultat: $s_p = 59{,}6727$

26 Antag $X_d = X_2 - X_1 \sim N(\mu_d, \sigma_d^2)$

27 Benyt Welsh-approksimation, dvs.

$$\mu_2 - \mu_1 = \bar{x}_1 - \bar{x}_2 \pm t_{1-\frac{\alpha}{2}}(\nu)\sqrt{\frac{s_1^2}{n_1}+\frac{s_2^2}{n_2}}$$, hvor

$$\nu \approx \frac{\left(\frac{s_1^2}{n_1}+\frac{s_2^2}{n_2}\right)^2}{\frac{s_1^4}{n_1^2(n_1-1)}+\frac{s_2^4}{n_2^2(n_2-1)}}$$

Mellemresultat: $\nu = 14$

28 $H_0: \sigma_1^2 = \sigma_2^2$, $H_A: \sigma_1^2 \neq \sigma_2^2$

Testvariabel: $F = \dfrac{S_1^2}{S_2^2} \sim F(n-1, m-1)$ under H_0