Lesson 2

Ex. 2.1.1 **a) F-test gives** $v = 7.75 > 5.95$; **significant difference..**

Ex. 2.1.2 **a)** $v_{14} = \frac{s_4^2}{s_1^2} = 3.14$. **As** $\frac{1}{7.15} < 3.14 < 7.15$ **we cannot claim that** $\sigma_4 \neq \sigma_1$**, etc. The other comparisons also do not point out any significant difference between standard deviations. It seems reasonable to assume that** $\sigma_1 = \sigma_2 = \sigma_3 = \sigma_4 = \sigma$**. The simultaneous confidence level** $\leq 6 \cdot 0.05 = 0.30$.
b) Let $\theta = \mu_1 - 3\mu_3 + 2\mu_4$**. We obtain** $I_\theta = (-5.76, 0.63)$**. Hence, it is possible that** $\mu_1 - \mu_3 = 2(\mu_3 - \mu_4)$**.**

Ex. 2.1.3 **a)** $v = 51.33 > 6.93$**, where value 6.93 is given by F(2,12)-table. With high probability there is difference between batches with respect to their tensile strengths.**
b) $I_\mu = (\bar{y}_{..} \pm t \cdot \frac{\tilde{s}}{\sqrt{3}}) = (7828, 8572)$**, where** $t = 4.30$ **and** $\tilde{s}$ **is calculated using** $y_{i.}$**.**

Ex. 2.1.4 **a) Significant on level** $\geq 2.5\%$.

Ex. 2.1.5 **a)** $\hat{\mu} = \bar{y}_{..} = 7004.6$**;** $\hat{\sigma}^2 = \frac{SS_E}{df_E} = 11.60$**;** $\hat{\sigma}_\tau^2 = 224.8$**.**
b) $v = 59.13. > F_{0.01}(4, 10)$**, reject** H_0**. With high probability there is variation between sensors.**