Lesson 6

Ex. 2.2.1 b) $v = 3.50 > 2.87$; **with high probability we have interaction.**
c) $Y_{ijk} = \mu_{ij} + \epsilon_{ijk}$, **i.e. complete two way / factor model.**
d) $I_{\mu_{ij}-\mu_{kl}} = \bar{y}_{ij.} - \bar{y}_{kl.} \pm 10.82$. **We get** $A = 2, B = 1$ **are significantly better than** $A = 1, B = 4$ **and** $A = 1, B = 5$. $I_{\mu_{21}-\mu_{14}} = (41.667 - 23.667 \pm 10.82) = (7.18, 28.82)$ **etc.**

Ex. 2.2.2 a) **Tukey's method :** $I_{\tau_i-\tau_j} = (\bar{y}_{i\cdot} - \bar{y}_{j\cdot} \pm 2.83)$.
t-interval method: $I_{\tau_i-\tau_j} = (\bar{y}_{i\cdot} - \bar{y}_{j\cdot} \pm 3.11)$.
b) $I_{\mu_i-\mu_j} = (\bar{y}_{i\cdot} - \bar{y}_{j\cdot} \pm 2.71)$.
c) **Two factor model gives** $s = 1.441$ **and one factor model** $\tilde{s} = 1.413$, **i.e.** s **and** $\tilde{s}$ **are approximately of the same size. Hence, we choose easier model, i.e. model no. 2.**

Ex. 2.5.5 We use block design with block=instrument. Test statistic $T = 10.89 > 9.49$. **With high probability there is significant difference between threads.**

Ex. 2.2.3 a) **Interaction effect is examined with** $v = 4.14 > 3.63$; **we conclude that with high probability there is interaction. The data should be analyzed as a complete two way / factor model, i.e.** $Y_{ijk} = \mu_{ij} + \epsilon_{ijk}$.
b) **t-interval method:** $I_{\mu_{i3}-\mu_{j3}} = (\bar{y}_{i3.} - \bar{y}_{j3.} \pm 14.486)$, **we get steam pressure 20 gives clearer filter than the other steam pressures.**

Ex. 2.2.5 a) **Use F-test,** $v = 20.13 > 7.01$; **Coppar concentration seems to have impact on the results.**
b) $I_{\beta_3-\beta_5} = (-9.89, \infty)$; $0 \in I_{\beta_3-\beta_5}$; **concentration 0.75 is not significantly better than concentration 0.3 according to analysis.**

Ex. 2.2.6 a) $v = 37.54 > 5.14$. **Significant interaction effect.**
b) $I_{\mu_{11}-\mu_{21}} = (3.0 \pm 18.0)$,
$I_{\mu_{12}-\mu_{22}} = (-26.0 \pm 18.0)$; **choose L2 for M2,**
$I_{\mu_{13}-\mu_{23}} = (33.5 \pm 18.0)$; **choose L1 for M3.**