

# Homework 2, 6 points

November 21, 2011

## 1 Instruction

- **Deadline:** 28th, November, 2011
- Hand in personal or to Room 758
- The home assignments shall be solved **individually**. The home assignment is not compulsory.
- Solutions will be graded, and may give points that are added to the result of the written examination, as described in the course description. The points from the home assignments can only be added to the results of the written examinations in December, 2011 and February, 2012. The points cannot be added to results from examinations written at later points of time. Home assignments that are handed in too late (i.e. after 28 November) give 0 points. It is not possible to get extra points by completing or correcting solutions after the deadline.

## 2 Problem 1

The effect of three different lubricating oils on fuel economy in diesel truck engines is being studied. Fuel economy is measured using brake-specific fuel consumption after the engine has been running for 15 minute. Five different truck engines are available for the study, and the experimenters conduct the following randomized complete block design (RCBD).

Oil	Truck				
	1	2	3	4	5
1	0.500	0.634	0.487	0.329	0.512
2	0.535	0.675	0.520	0.435	0.540
3	0.513	0.595	0.488	0.400	0.510

- Can you explain why use RCBD instead of complete randomized design? What's the disadvantages of RCBD?
- Analysis the data from this experiment.
- Use the Fisher LSD method to make the comparisons among the three lubricating oils to determine specifically which oils differ in brake-specific fuel consumption.

## 3 Problem 2

An industrial engineer is investigating the effects of four assembly methods (A, B, C, D) on the assembly time for a color television components. Four operators are selected for the study. Furthermore, the engineer knows that each assembly method produces such fatigue that the time required for the last assembly may be greater than the time required for the first, regardless of the method. That is, a trend develops in the required assembly time. To account for this source of variability, the engineer uses the Latin square design shown below. Analyze the data from this experiment ( $\alpha = 0.05$ ) and draw appropriate conclusion.

Order of Assembly	Operator			
	1	2	3	4
1	$C = 10$	$D = 14$	$A = 7$	$B = 8$
2	$B = 7$	$C = 18$	$D = 11$	$A = 8$
3	$A = 5$	$B = 10$	$C = 11$	$D = 9$
4	$D = 10$	$A = 10$	$B = 12$	$C = 14$