Norwegian University of Science and Technology
Department of Mathematical Sciences

Grading of TMA4267, 19 May 2017

This document describes how the grading was done for the TMA4267 V2017 exam. The NTNU official grading scale was used:

A : 89–100 points

B : 77–88 points

C : 65–76 points

D : 53–64 points

E : 41–52 points

F : 0–40 points

To secure a passing grade it was necessary to pass the written exam (scoring at least 32/80 points), and to secure a score of at least 8/20 in total for the 4 compulsory exercises.

A total of 55 students handed in the written exam, resulting in the following grade frequencies:

Grade	A	B	C	D	E	F
Frequency	20	44	22	4	11	0

For the scoring of the exam, each of the 8 items were given maximum 10 points. For the different questions within each item, the maximal score is given on the next page. This grading scheme will also be used for complaints (klager).

The average score for the 8 items were:

Item	1a	1b	2a	2b	2c	3a	4a	5a
Average score	9.8	6.3	8.3	8.4	6.4	6.7	7.1	4.0

1a Random vector

- $\boldsymbol{C}$: 2
- $\mathrm{E}(\boldsymbol{Y}) = 0$: 1
- $\mathrm{Cov}(\boldsymbol{Y}) : \frac{1}{3} + \frac{2}{3}\rho, 2(1-\rho)$: 4
- Y is mvN: 1
- Y_1 and Y_2 independent: 2

1b Covariance matrix

- $\rho \in (-0.5, 1)$: 2
- Why pd? : 2
- Distribution: mvN(0,Λ): 3
- Probability=1-Φ(2.31) = 0.0104: 3

2a Understanding print-out from multiple linear regression.

- Std.Error=0.1: 3
- p-value: 0.5962: 3
- Model fit (R^2, sign of regr, residual): 4

2b A vs B and model selection

- Prefer B: 2
- Prediction: 2
- 6 models: 2
- BIC: 2
- Choose model: 2

2c Linear hypotheses.

- $\boldsymbol{C}$ and $\boldsymbol{d}$: 2
- Test statistics and significance: 6 (3 if correct formula with SSE, but wrong calculation of SSE. 1 if Fobs based on C-version only.)
- Model B or C: choose B: 2

3a Fractional factorial

- Half fraction of 2^4: 1
- Generator: D=-ABC: 2
- Defining relation: I=-ABCD: 1 (ok to explain)
- Resolution: IV: 1 (ok to explain)
- Aliases: 3
- Why random order: 2

4a Underfitting

- $\boldsymbol{H_1}$ idempotent: 1
- trace=k: 2
- SSE1: 2
- E(SSE1/(n-k)): 5

5a Independence

- Multivariate normal via mgf: 5
- Condition $\boldsymbol{A\Sigma B}^T = \boldsymbol{0}$: 5