

KTH Electrical Engineering

Dept. of Electric Power Systems EG2050 SYSTEM PLANNING Autumn 2014/Spring 2015

Examination 2014–2018

The last round of this course was given in the spring semester 2014. According to KTH rules, students will have the possibility to write the exam twice a year during three years after the course was discontinued. This means that it will be possible to complete the course until the spring semester 2018.

The examination is divided in two parts: a laboratory course (LAB1) and an exam (TEN1). In order to receive a final grade for the course, both the laboratory course and the exam must be completed. Instructions how to do this are given below.

Laboratory course

The laboratory course consists of home assignments that are presented in seminars. Similar assignments are given in the courses EG2200 Power Generation Operation and Planning (6 hp) and EG2205 Power Generation Operation and Planning (7.5 hp). Thus, System Planning students can complete the laboratory course by attending seminars in any of these courses.

The maximal score of the laboratory course is 54 points. In order to pass the laboratory course, students need to earn at least 50 points. Students receive points for preparing presentations in the seminars. Instructions and schedule for the seminars are found in the course syllabus of EG2200 and EG2205 respectively.

Please notice that the points from the seminar is only valid during the same academic year. Hence, your score in the laboratory course will be reset in August, when a new academic year begins.

EG2200

This course is given in English during the autumn semester (period 1–2). The home assignments in EG2050 correspond to project assignments E1–E4 in EG2200, which can be downloaded from the KTH Social web page of EG2200. However, as the EG2200 course does not cover Monte Carlo simulation, there will be some modifications for System Planning students:

- Problem 4a gives 3 points instead of 2.
- Problem 4b is not included in the laboratory course.
- Problem 4c gives 4 points instead of 3.
- There are three additional questions 4g-h (see below).

Problem 4f (4 p)

Define an electricity market model which can be used to analyse scenarios for a Monte Carlo simulation of Land. The model should take into account the losses and transmission limits of the HVDC link. State the scenario parameters, model constants and result variables of your model, and describe how the result variables are calculated.

The load in Storön is N(700, 100)-distributed and the load in Lillön is N(125, 10)-distributed. The loads of the two areas can be assumed to be independent of each other.

Problem 4g (4 p)

The table below provides some scenarios for a Monte Carlo simulation of the electricity market in Land if the wind farm is built. No variance reduction techniques have been used in this simulation. Which estimates of *ETOC* and *LOLP* are obtained from these scenarios?

Scenario	Available generation capacity [MW]			Load [MW]	
	Hydro	Oil condensing	Wind power	Storön	Lillön
1	750	300	300	586	139
2	750	300	0	641	126
3	750	300	300	600	144
4	750	300	150	784	114
5	750	300	300	781	142
6	750	300	0	803	140
7	750	300	150	765	122
8	750	300	0	754	106
9	750	300	0	570	134
10	750	300	0	865	107

Some scenarios for a Monte Carlo simulation of Land.

Problem 4h

Make a list of the approximations you have used in question 4g and 4h. How do these approximations differ compared to probabilistic production cost simulation (question 4e)? Which method do you find most appropriate to simulate the electricity market in Land?

EG2205

This course is given in Swedish during the spring semester (period 3). The home assignments in EG2050 correspond directly to project assignments E1–E4 in EG2205, which can be downloaded from the KTH Social web page of EG2205.

Exam

Exams in EG2050 will be offered in exam period 2 (January) at the same time as the final exam of EG2200 and in exam period 3 (March) at the same time as the final exam of EG2205. Students must—as usual—sign up for the exam at least two weeks before the exam. If no students have signed up for an EG2050 exam, the exam will be cancelled!

The exam is divided in two parts, where the first part of the exam decides whether or not the grade will be failed or passed. To pass it is necessary to score at least 33 points out of 40. Examinees who have failed the exam but are close to the requirement for passing (i.e., 31 or 32 points) may write a supplementary test. If the result of this test is approved, the student will get the grade

Score from part I	Total score (part I + part II)	Grade
0–29	-	F
31–32	-	Fx
33–40	33–59	Е
33–40	60–69	D
33–40	70–79	С
33–40	80–89	В
33–40	90–115	А

Grading in the exam

E. The date of the extra test is decided by the course coordinator after consulting the concerned students. However, the student must notify his or her intention to write the supplementary test no later than one month after the exam.

The second part of the exam will only be marked if the student has passed part I. Part II gives a total of 60 points. Then the results of parts I and II will be added together and the sum determines the examination grade (A-E).

The following aids are allowed at the exams and partial exams:

- Calculator without information relevant to the course.
- One handwritten, single-sided A4-page with your own notes (original, not a copy), which should be handed in together with the exam.