



Optimization

Individual Project Work Instructions & Schedule

Prof. dr. ir. Toon van Waterschoot

Faculty of Engineering Science

ESAT – Department of Electrical Engineering

KU Leuven, Belgium



Individual project work (1)

- **Step 1: Think of a problem**
 - preferably choose problem from your own discipline
 - possibly related to your Master thesis topic
 - topic too difficult? select subproblem of larger problem
 - inspiration? list of previous years' project titles on Toledo
 - send project title & student names to [me](#) by Mon. 17/11
- **Step 2: Formulate problem in optimization framework**
- **Step 3: Write & test Matlab software to solve problem**
- **Step 4: Write report**
- **Step 5: Submit report & Matlab code**
- **Step 6: Discuss project during oral exam**

Individual project work (2)

- **Step 1: Think of a problem**
- **Step 2: Formulate problem in optimization framework**
 - define variables, objective function, constraints
 - recognize structure of your problem (LP, QP, convexity, ...)
 - formulate optimality conditions
- **Step 3: Write & test Matlab software to solve problem**
- **Step 4: Write report**
- **Step 5: Submit report & Matlab code**
- **Step 6: Discuss project during oral exam**

Individual project work (3)

- **Step 1: Think of a problem**
- **Step 2: Formulate problem in optimization framework**
- **Step 3: Write & test Matlab software to solve problem**
 - select suitable algorithm for solving optimization problem
 - implement algorithm in Matlab (or Python, C, ...)
 - use existing software/toolboxes/... when appropriate/efficient
 - design relevant simulation experiment(s)
 - run simulations and analyze results
- **Step 4: Write report**
- **Step 5: Submit report & Matlab code**
- **Step 6: Discuss project during oral exam**

Individual project work (4)

- **Step 1: Think of a problem**
- **Step 2: Formulate problem in optimization framework**
- **Step 3: Write & test Matlab software to solve problem**
- **Step 4: Write report**
 - min. 3 – max. 5 pages
 - proposed structure:
 - (1) introduction and motivation of the project topic
 - (2) optimization problem formulation and analysis
 - (3) optimization algorithm description
 - (4) analysis and discussion of simulation results
- **Step 5: Submit report & Matlab code**
- **Step 6: Discuss project during oral exam**

Individual project work (5)

- **Step 1: Think of a problem**
- **Step 2: Formulate problem in optimization framework**
- **Step 3: Write & test Matlab software to solve problem**
- **Step 4: Write report**
- **Step 5: Submit report & Matlab code**
 - send project deliverables to [me](#) by Fri. 19/12
 - make sure that:
 - code is self-contained (include auxiliary functions, data sets, ...)
 - code is well structured and commented
- **Step 6: Discuss project during oral exam**

Individual project work (6)

- **Step 1: Think of a problem**
- **Step 2: Formulate problem in optimization framework**
- **Step 3: Write & test Matlab software to solve problem**
- **Step 4: Write report**
- **Step 5: Submit report & Matlab code**
- **Step 6: Discuss project during oral exam**
 - 10 min. discussion based on report & Matlab code
 - individual discussion and evaluation (even if project is made by group of 2 students)

Time budget & schedule



17/11

- **Step 1: Think of a problem (2h)**

- feel free to ask advise during ex. sessions 3 – 6

25/11

- **Step 2: Formulate problem in optimization framework (4h + 2h in exercise session 7)**

- prepare your questions about Step 2 by ex. session 7

04/12

- **Step 3: Write & test Matlab software to solve problem (4h + 2h in exercise session 8)**

- prepare your questions about Step 3 by ex. session 8

19/12

- **Step 4: Write report (6h)**

12/01

- **Step 5: Submit report & Matlab code**

- **Step 6: Discuss project during oral exam**