

OPTIMISATION AND OPERATIONS RESEARCH II: PROJECT HANDOUT 5

1. PUTTING IT TOGETHER

We have considered several problems along the way so far. In this practical, each group will put what you have learned together.

- (1) You will now work on a problem where the parameters of the power plants are set in a data file.
 - Each group will have its own different dataset to work on: please look on MyUni for a file called `project_data_GROUPNAME.csv` where the `GROUPNAME` is the letter or number assigned on MyUni.
 - The data will be a CSV file that describes the parameters of a set of power plants.
 - Parameters will be usually be assigned names based on those in the previous handouts, but note that the heat curve for a power plant is given by

$$H(P) = h_0 + h_1P + h_2P^2,$$

where P is power and H heat.

- The demand power is set to be 1000 MW in each case.
 - All other factors such as fuel prices, carbon costs etc., are as given.
 - Some data in the file may be irrelevant to your problem.
 - DON'T just type in the values into Matlab. Learn to use its ability to read (CSV) data-files. I may change the datasets before the end of the project.
- (2) You must use your **approximation** in conjunction with your approach to solving the **integer unit commitment problem**, which considers which power plants to “commit” to the problem, *i.e.*, which power plants to switch on as well as the output power each plant produces.
 - You are allowed to add to the solution, *e.g.*, by creating your own heuristics or improving your past approximations.
 - Your own external research on the problem will add value to your results.

2. ASSESSMENT

Your project is worth 20% of your mark, but note that it is a **hurdle**: you must achieve a mark of 40% in the project to pass OORII. Your project will be assessed approximately as

- your displayed team and time management (10%),
- an oral presentation in Week 12 (40%), and
- a written report (50%).

All students in a group will receive the same mark unless there is a clear reason for an exception. You succeed or fail as a group.

Much advice on these can be found in the Group Project module on MyUni including:

- assessment rubrics;
- a LaTeX report template (which has a lot of advice, but which will also need to be carefully adapted to the project); and
- checklists and other advice.

The most important point to take on board is that your notional target audience is your boss. Imagine that this is not a University exercise, but rather this is a real project, for a real power company. Your report is aimed at selling your solution to your boss. Thus it must be written in a different style to a conventional class exercise solution.

There is no strict page limit, but you are expected to be concise and focused. Do not unnecessarily draw out tangential material, or waffle.

Additional advice will be provided via announcements. Please email any questions, or talk to me in one of the practical/project sessions, or during consulting times.

3. PRESENTATION LOGISTICS

- We will aim to do presentations during your tutorial slots, but I realise not all students can attend both tutorials. Hence, I will aim to schedule talks to maximise attendance. **Please let me know your constraints, *i.e.*, can your group attend one or both sessions.** Session times:
 - Tuesday 5-6pm,
 - Thursday 9-10am.
- As many students as possible should attend both sessions. As a bribe to get you all there, (good) questions asked (of other students) will net bonus marks.
- Talks will be *very* short. We need to get through 6 talks in each 50 minute session, so they will be 6 minutes long, plus 2 minutes for questions.
 - Timing is tight, so you will lose significant marks for running over time.
 - However, preparing a good short talk, and sticking to time are very useful skills, so this isn't a bad thing.
- I will expect to receive your presentation slides the Friday of week 11, in order to pre-load them. That includes all groups, even those presenting on Thursday, so that no group gets an unfair advantage. It also provides an opportunity to provide some feedback before the talk if time allows.
- The presentation can be made by one student on behalf of the group, or by the group. The mark will be based on the overall quality of the presentation.
- Some groups prefer to go first, others last. In order to be fair to all groups the schedule will be random.