

Take-home Exam

Instruction:

- 0) Read this assignment guideline and the assignment questions thoroughly.
- 1) Download your personalized data file from the website. It is in XLS format. Each individual will work with a different dataset. Do not take results from your classmates. You have to make your own.
- 2) Zip all the working files into a single ZIP file and name it with your CU ten-digit ID, i.e., 5x8yyyyy20(yourname)THE.zip. The working files must include the DEAP input text file, the DEAP instruction text file, the DEAP output text file, the two Excel worksheets (for the **Primal and Dual LP** problems) together with your written/typed LP formulation and discussion in pdf.
- 3) Submit only the zipped file to pongsa.p@chula.ac.th with the subject 'MSCLOG xxxxxx' by due date/time.

Statement of Problem

In a survey of city administration engineering units conducted in 2012, 64 municipalities (DMUs) had been selected. For each DMU, information on two basic outputs (i.e., new investment (Y1) and existing operations(Y2)) were gathered for the previous fiscal year. In addition to the outputs, information for three basic inputs (i.e., full-time equivalent employees (X1), material supplies(X2), fuel and energy(X3)) were also collected over the same time period. The other outputs and inputs were ignored as they were considered complementary.

Assignment Questions

- 1) Run DEAP v2.1 software to determine technical efficiency(TE) and Scale efficiency (SE) scores for the 64 DMUs under the assumption that all DMUs have identical VRS (variable return-to-scale) production functions. Those with odd student CR#'s will do input-oriented measure and those with even student CR#'s will do output-oriented measure.
- 2) Select the inefficiently worst (with the lowest VRS Technical Efficiency score) DMU from the DEAP result. Formulate the Primal and the Dual LP problems for the selected DMU. Explicitly specify the objective function and all the constraints.
- 3) Use Excel spreadsheet to solve the primal and the dual LP problems for the worst DMU selected in 2). Verify the Excel result as it must be exactly the same as that from DEAP

-----End of Take-home Exam-----