

ME402 Assessment–Unit 4.1: “Design Decisions in Engineering: Constrained Optimization”

Constrained optimization is one of the most important tools employed by engineers to support their design decisions. In this assessment, you will learn to perform linear programming and dynamic programming using a Microsoft Excel spreadsheet. If you do not have access to Microsoft Excel, you can use Google Spreadsheet, which has similar functionality and layout.

Before working on the assessment, please complete all the required readings for Unit 4.1.

To learn how to perform linear programming in Excel, please click on the following, [Linear Programming Formulation in Excel](#), and watch this brief YouTube tutorial. Another good source is “Excel Solver Tutorial,” created by Stanford Professor Ben Van Roy. Click on the following, <http://www.stanford.edu/~ashishg/msande111/notes/>, and download the PDF file titled “excel_solver.pdf.”

If you want to use Google Spreadsheet for the assessment, go to <http://support.google.com/docs/bin/answer.py?hl=en&answer=139704> for a brief tutorial on optimization using Google Spreadsheet. For this assessment, you are encouraged to use the template provided at the end of the webpage.

Solve the following linear program problem¹:

Maximize the objective function $Z = 7x_1 + 6x_2$, subjected to the following constraints:

- $3x_1 + 6x_2 \leq 450$
- $9x_1 + 6x_2 \leq 630$
- $2x_1 \leq 110$
- $x_1 \geq 0, x_2 \geq 0$

¹The exercise was created by Professor Mari Yetimyan at San Jose State University.