Linear Programming by Tableau

File: Tableau.cln

Introduction

If you have been trained as a financial controller, stock controller or similar profession, you will have learnt Linear Programming using the Simplex Method.

This sheet allows you to solve Linear Programming problems simply by entering the values you would normally enter in the simplex tableau.

About this Sheet

The left side of this sheet contains the input tables, into which the equation and the constraints are entered.

The right side of the sheet displays the results of the optimisation.

The sheet has been dimensioned to allow up to 10 variables and 8 constraints of each type (>=, = and <=).

- To add more constraints, click on the table to be resized, switch to Edit Mode and use Number of Rows/Columns dialogue on the Object Menu to simply increase the number of rows in the tables.
- To add more variables is slightly more difficult. Switch to Edit Mode, click on the Solution Search object and select Outputs to Vary on the Object menu. The initial value of output A is {0,0,0,0,0,0,0,0,0,0} which is an array of 10 zeroes. If you want 12 variables, increase this array to contain 12 zeroes.

You also need to widen the input tables to cope with the extra number of variables. Switch to Edit Mode and use the Number of Rows/Columns dialogue from the Object Menu to resize each table.

How to Use

- Enter the equation to optimise in the appropriate table. For example to optimise 80X1 + 70X2 + 95X3 + 90X4 enter 80, 70 95 and 90, leaving the rest of the table blank.
- Enter the <= constraints in the table, for example if 5X1+5X2+4X3+4X4 must be less than or equal to 450, enter 5, 5, 4 and 4 in the <= table and 450 in the corresponding row of the value table.
- Similarly enter the >= constraints and the = constraints. Ensure that there are no constraints listed that are not part of your problem.
- The Solution Search object is set to **maximise** the result of the equation, if you want to minimise or find a particular solution, switch to Edit Mode, click on the Solution Search object, select Solution to Find from the Object menu and select the appropriate option.
- Finally to solve your sheet, switch to Use Mode and click on the Solution Search object, the sheet will be solved.

The Example Given

The example values in this sheet are for the following problem:

Maximise 80X1+70X2+95X3+90X4

Subject to Constraints	5X1+5X2+4X3+4X4 <= 450
	X1+X2+X3+X4 <= 120
	2X1+2.5X2+3.5X3+3.5X4 <= 280
	0.5X1+0.5X2+0.5X3+0.5X4 <= 80
	X1 <= 30
	X2 <= 40
	X3 <= 20
	X4 <= 25
Optimal Solution	X1 = 30
	X2 = 24
	X3 = 20
	X4 = 25
Yielding a Result of	8230