Use of excel solver for linear programming

[FREQUENTLY ASKED QUESTIONS]

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FREQUENTLY ASKED QUESTIONS

Q-1. What is the purpose or need for using computer packages instead of manual method to compute LPP?

A-1. Linear programming is a very powerful technique for solving allocation problems and has become a standard tool for many businesses and organizations. Though Danzig's simplex method allows solutions to be generated manually, the repetitive nature of producing solutions or iterations is so tedious that it becomes necessary to use computer package for the ease and error free solutions.

Q-2. Why do we use Excel solver to solve LPP over other software?

A-2. Excel is attractive for at least two reasons. Firstly, Excel is perhaps the most popular spreadsheet used both in business and in universities and as such is very accessible. Second to this, the spreadsheet offers very convenient data entry and editing features which allows the student to gain a greater understanding of how to construct linear programs.

Q-3. Is Excel solver the only software package available for solving LPP?

A-3. There are of course numerous software packages which are dedicated to solving linear programs (and other types of mathematical program), of which possibly LINDO, GAMS and XPRESS-MP are the most popular. All these packages tend to be DOS based and are intended for a specialist market which requires tools dedicated to solving LPs.

Q-4. How do we add Solver Add-in in Excel (2013)?

A-4. To use Excel to solve LP problems the Solver add-in

must be included. Typically this feature is not installed by default when Excel is first setup on your hard disk. To add this facility to your Tools menu you need to carry out the following steps (once-only):

- Click the File tab, click Options, and then click the Add-Ins category.
- In the Manage box, click Excel Add-ins, and then click Go.
- In the Add-ins available box, select the Solver Add-in check box, and then click OK

Q-5. What all is depicted in sensitivity report of Excel Solver?

A-5. The Sensitivity report is fairly standard, providing information on shadow values, reduced cost and the upper and lower limits for the decision variables and constraints. The Limits Report also provides sensitivity information on the Right Hand Side values.

Q-6. How can you amend/intervene in the solution generating process of Solver?

A-6. There are several options to Solver that can allow you to amend/intervene in the solution generating process. The 'Options' button in the Solver dialogue box reveals a dialogue box having various options. You can use this to affect how accurate your solution is, how much 'effort' Solver puts into to finding the solution and whether you want to see the results of each iteration.

The Tolerance option is only required for integer programs (IP), and allows Solver to use 'near integer' values, within the tolerance you specify, and this helps speed up the IP calculations. Checking the Show Iteration Results box allows you to see each

step of the calculation, but be warned, if your model is complex this can take an inordinate length of time. Use Automatic Scaling is useful if there is a huge difference in magnitude between your decision variables and the objective value.

The bottom three options, Estimates, Derivatives and Search affect the way Solver approaches finding a basic feasible solution, how Solver finds partial differentials of the objective and constraints, and how Solver decides which way to search for the next iteration. Essentially the options affect how solver uses memory and the number of calculations it makes. For most LP problems, they are best left as the default values.

Q-7. How should you save the report generated of the model?

A-7. The 'Save Model' button is very useful, particularly if you save your model as a named scenario. Clicking this button allows you to assign a name to the current values of your variable cells. This option then allows you to perform further 'what-if' analysis on a variety of possible alternative outcomes - very useful for exploring your model in greater detail.