Chapter 3: Art of Optimization

# LP Solution: Blending Application

## Corresponding reading: Chapter 3, Page 2

### Purpose: Using Excel Solver to solve the LP for the blending problem.

1. The data for the coffee manufacturing company example discussed in Case 3.2.a1 is repeated below.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Acidity (0-9) | Bitterness (0-9) | Aroma (0-9) | Cost ($/lb) |
| Type 1 | 4 | 8 | 6 | 0.95 |
| Type 2 | 6.5 | 6 | 9 | 1.25 |
| Type 3 | 8 | 4 | 7 | 1.15 |
| Range |  |  |  |  |

Below is the LP formulation for this problem including the additional restriction by the supplier and regulatory agencies.

(Cost)

(Acidity)

(Bitterness)

(Aroma - min)

(Aroma - max)

(Sum equals 1 lb)

(Type 1 at least twice Type 2)

(Type 3 at most 30%)

(Type 1 no more than other types combined)

(Non-negativity)

1. Set up this LP problem in Excel and use Solver to solve it. *Remember to generate the Answer and Sensitivity reports.* Also remember to submit the solution Excel file.

Hint: A decision variable in the right-hand side of a constraint can be represented by referring to the corresponding yellow cell.

1. What is the optimal cost for 1 lb of the blend?
2. What are the optimal values of the decision variables?
3. Which constraints are binding?
4. Remove the *non-binding* constraints from Solver and rerun Solver to find the optimal solution. Did the optimal solution change after removing the non-binding constraints? What conclusion you get?

***Note:*** *Understanding the case and what you need to do is PART OF THE CASE. If you do not understand a specific part, or are not sure what you should do, you need to review the corresponding reading section in the text before asking for help. You might also need to do some search on the internet. That is all part of the case and your learning process.*