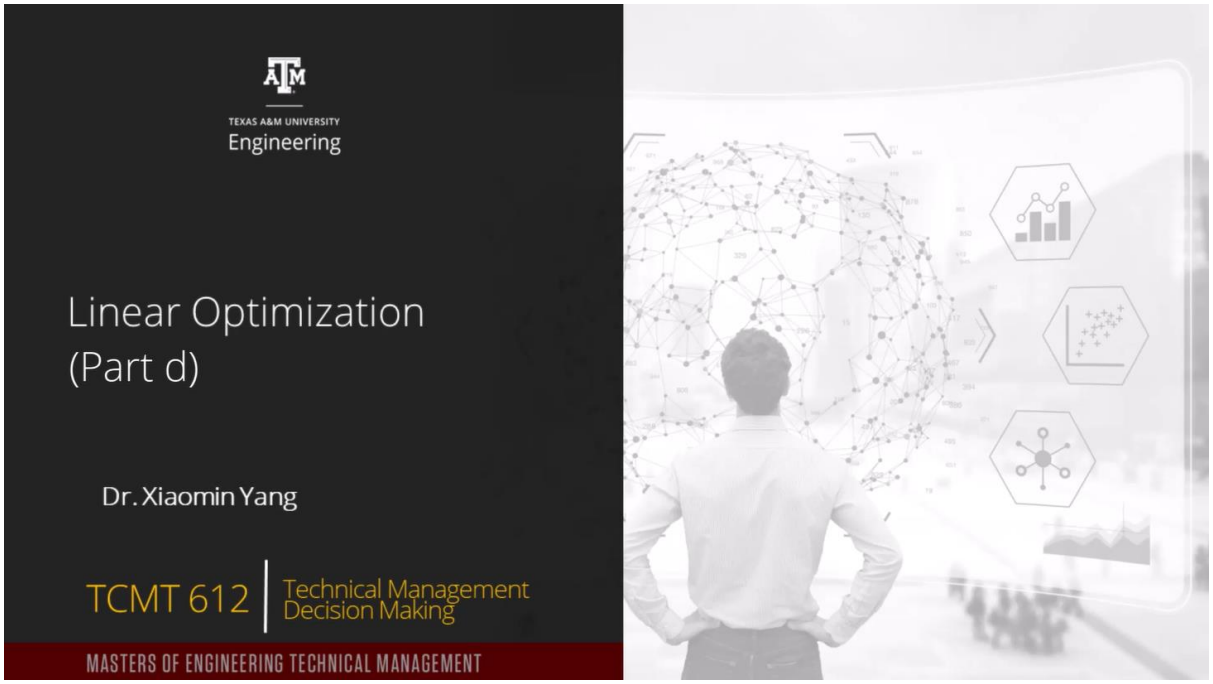
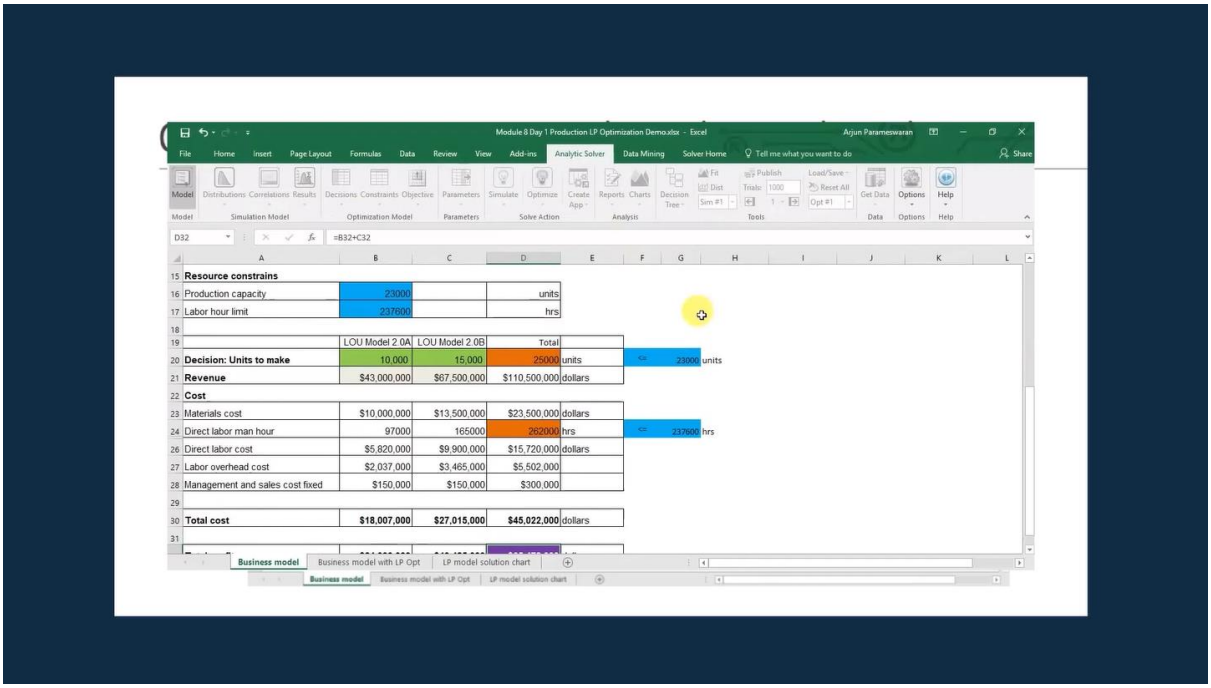
M7L2d. Linear Optimization

Slide #1



Slide #2



The video clip shows how you can set up the optimization model with the Analytics Solver Toolbar.

Now, let us look at how the model is set up.

Let us go to the Analytics Solver tab.

We need to optimize this.

We go to the Optimization option.

Now, this is our objective function. I have selected that, and I need to add my objective.

I click on this, and we need to maximize.

I select maximize and then normal.

Our objective function has been added here.

Now we need to add the variables, so these are our variables.

These are the decision variables that we need to find the values for.

I click on decisions and add these under normal variables.

Now we need to take a look at the constraints.

Firstly, our production should be within the sales forecast values.

I select our decision variables and I go to constraints, normal constraints less than equal to.

This means that this should be less than or equal to the maximum value.

So the number of units made should be less than or equal to the maximum sales forecast.

This is the first constraint.

I need to add more constraints.

I click on Add.

The second constraint is that the number of units made should be greater than or equal to, that is at least match the minimum forecast.

This is greater than or equal to this.

This means the number of units produced should be greater than the minimum forecast at least, or at least equal to the minimum forecast.

I click OK.

We have two of our constraints here.

Now, what are the other constraints we need to consider?

In the problem, it was specified that the plant capacity is limited at 23,000 units per year.

In this case, because I have sample values, these are not optimum values.

The total is 25,000 units, which is infeasible, which is not the correct solution.

This value should be less than or equal to 23,000.

So let us add this as a constraint.

Click on this cell, go to constraint, normal, less than or equal to, and I select this one because this is the value that we need to restrict this cell with.

We need to ensure that the value in this cell is less than or equal to the value in this cell.

I add one more.

The next constraint we need to consider is the labor.

The labor hours available to us is limited by this value.

I select this one, say less than or equal to, and select this value, which is the labor limit that is provided to us, and I say OK.

Now, one more important constraint that we need to add is for these two cells.

The number of units produced should not be a fractional value because while solving the solver may give out fractional values, which is not practical.

You cannot sell half of a product in the market.

You need a complete product.

So that would not be the practical solution.

We need to ensure that these values are integers.

I select these, go to Constraints, Variable Type Bound as Integer.

So the solver will ensure that these values are kept as integer values. Now our model is set up. I will go here and click Solve.Skip Guidance.

And the model found an optimum solution.

If you take a look at these two values, these have changed and as I had entered 10,000 and 15,000, the model has corrected these values to the optimum values. And if you observe all the conditions are met, and this is the optimum solution, this is the maximum profit that you can make considering the given constraints of the problem.