

Defining an Objective Function

The goal of the optimization process is to find the parameter values that result in a maximum or minimum of a function called the objective function. *Objective function* is a mathematical expression describing a relationship of the optimization parameters or the result of an operation (such as simulation) that uses the optimization parameters as inputs. The optimization objective is the objective function plus optimization criterion. The latter determines whether the goal of the optimization is to minimize or maximize the value of the objective function.

To define the objective function

1. In the **Projects** view, click the optimization experiment.
2. In the **Properties** view, specify the objective function in the **Objective** edit box. The top level agent is accessible here as `root`.
3. Define the optimization criterion.
Choose **Minimize/Maximize** option to minimize/maximize your objective function.

You can enter any Java expression as an objective function, including an arithmetic expression or method call. Since expression is considered to be in context of the top level agent, it can access variables and parameters of the top level agent. If your function is rather sophisticated, you can define a method, calculating the function, in the **Additional class code** editing field in the **Advanced Java** section of the top level agent, and place the method call in the **Objective** edit box. If you use a method, it is called only once after each simulation rather than numerous times during a simulation. If an objective function calculation is time-consuming, placing it in a method is preferred.

The OptQuest Engine obtains a sample of the objective function at the end of each simulation. The engine analyzes a sample, modifies optimization parameters according to its optimization algorithm, and starts a new simulation.

Therefore, optimization is an iterative process where:

- The OptQuest Engine calculates possible solutions for the parameters
- The objective function and constraints are evaluated using the suggested solutions
- The results are analyzed by the OptQuest Engine, and a new set of possible solutions is calculated