

How to Increase Optimization Performance

Here are some tips you may find helpful:

- Debug your model before starting the optimization. If your model cannot run properly under some values of optimization parameters, you can restrict the search space using ranges. Otherwise, be aware of possible incorrect model operation.
- If the optimization engine finds all solutions to be infeasible, this indicates that there is no solution in the parameter space satisfying all the constraints. Possible reasons for this are:
 1. The constraints are inconsistent. Check for conflicting constraints, such as $x > 25$, $x < 24$. If variables appearing in the constraints are calculated using some formulas inside the model, the inconsistency can be in those formulas.
 2. The ranges of the optimization parameters conflict with the constraints.

If you find optimization performance unsatisfactory, consider the following recommendations.

Find an optimal solution faster

- Adjust the OptQuest Engine settings for your problem. Fine-tuning these settings can increase optimization performance (for more information, please consult AnyLogic Class Reference):
- Suggest initial values for optimization parameters as close to the optimal value as possible
- Reduce the search space by specifying ranges for optimization parameters
- Exclude parameters that do not influence the objective function
- Avoid using constraints. First, optimize your model without constraints; then check the optimal solution for constraints. If some constraints are not satisfied, start optimizing with constraints.
- Solve the optimization problem interactively and iteratively:
 1. Initially, use a rough approximation of the problem: wide ranges, big steps, low precisions.
 2. Run the optimization until the best-found value starts changing slowly.
 3. Set up the optimization more precisely. Reduce ranges and steps of optimization parameters. Start with optimization parameter values obtained on the previous step.
 4. Run the optimization until the best-found value starts changing slowly. If you are satisfied with the results, stop the optimization. Otherwise, go back to step 3.

In general, the optimization process may be very time-consuming, especially if there are multiple parameters and constraints. If nothing from the list above helps improve performance, try using a more powerful workstation or schedule more time for optimization.