

Gurobi Version 9.1

The world's fastest solver provides the next level in performance, accuracy, and productivity.

Gurobi Optimizer

Faster than Ever

- ✓ **Primal simplex:** 17% faster overall, 37% faster on models that take at least 100 seconds.
- Dual simplex: 29% faster overall, 66% faster on models that take at least 100 seconds.
- ✓ Barrier: 15% faster overall, 34% faster on models that take at least 100 seconds.
- ✓ Mixed-integer linear programming (MILP): 5% faster overall, 10% faster on models that take at least 100 seconds.
- Convex mixed-integer quadratic programming (MIQP): 6% faster overall, 20% faster on models that take at least 100 seconds.
- Convex mixed-integer quadratically constrained programming (MIQCP): 13% faster overall, 57% faster on models that take at least 100 seconds.
- Non-convex mixed-integer quadratically constrained programming (non-convex MIQCP): 4.1x faster overall, 9.6x faster on models that take at least 100 seconds.
- ✓ Irreducible Infeasible Set (IIS) computation: 2.6x faster overall, 5.7x faster on models that take at least 100 seconds.
- Better MIP feasible solutions: Heuristics are significantly better at finding high-quality solutions earlier.

New Features

- NoRel Heuristic This new heuristic finds high-quality solutions in situations where the linear programming (LP) relaxation of the mixed-integer programming (MIP) problem is too expensive to solve.
- Integrality Focus This new feature allows users to be much stricter on integrality constraints, thus avoiding many undesirable results (including trickle flows) that can come from small integrality violations.
- Python Matrix API Enhancements Gurobi's Python interface gurobipy has been extended and improved to better support matrix-oriented modeling.
- ✓ **Pip Install Support** Users can now utilize pip, a Python tool, to install Gurobi in their Python environment.
- Releasing the GIL in Python API When the optimize() method is called, gurobipy now releases the Global Interpreter Lock (GIL). This allows user programs to execute other Python code in a separate Python thread while Gurobi's optimizer is running.
- ✓ **Tuning Tool Enhancements** We added a number of additional controls to our tuning tool.
- Record/Replay for Compute Server and Cloud We now support the record/replay feature for Gurobi Compute Server and Gurobi Instant Cloud.
- Pre-specified User Cuts By setting the Lazy linear constraint attribute to the new value -1, one can declare a linear constraint to be a user cut. This means that the constraint is redundant to the model and should only be added to the LP relaxation if it allows to cut off an LP solution that is encountered during the MIP solving process.



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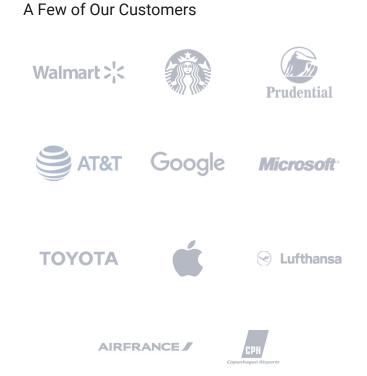
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Info@gurobi.com

1 (713) 871-9341

www.gurobi.com