

Thu Morn	Thu Aft	Thu evening	Fri Morn	Fri Aft
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Must be done
by noon

Conference Room

9 am - noon 2nd fl. of Academic Bldg

Bound Constrained Optimization:

Only bounds (simple bounds)

No constraints

{ L-BFGS-B - limited memory BFGS
(Tron - Newton Method

used by Nonlinear Constrained Opt.
Solvers

IPOPT can use TRON.

Complementarity Problems

Find an equilibrium point

- constraints of the form

$$(x_j)(f_j(x)) = 0$$

- no objective fn

PATH - oldest, most stable

Global optimization

- heuristics

- accommodate integer variables

BARON - most stable

Solver use limited by
problem structure

Linear / Linear Network

- CPLEX best solver

Simplex

interior-point method

- MOSEK well-regarded interior-point method

- PCX and OOQP

↳ interior-point method

↳ solver development framework

Mixed-integer Linear:

Linear problems with some integer variables

- Binary variables OK
- Purely integer / purely continuous OK

Mixed Integer Linear

CPLEX - best

Cbc - open source from IBM

feasumpump - generating feasible mixed integer solns

Mixed Integer Nonlinear

Bonmin - uses IPOPT

FilMINT * new solver

MINLP } both use

MINLP } filter SQP

an nonlinear solver

IPOPT - Can solve very large-scale problems

- but cannot be warmstarted

- better for solving large problems with few integer variables

filterSQP - good on small-to-medium
scale problems

- can be warmstarted

• good for small/medium problems,
numerous discrete variables

Multi Solvers:

Benchmark - tool that sends
a problem to multiple solvers
on the same machine (for
comparing solvers)

GAMS - AMPL - translator

provide model in GAMS

solve using a solver that
takes AMPL input

Nonlinearly Constrained Optimization

Sequential Quadratic Programming:

- small-to-medium scale
- very reliable
- certificates of infeasibility

filter (filterSQP), SNOPT
best

• Interior-Point Methods

- good for large scale problems
- generally reliable, but theoretical difficulties on some, limited infeasibility identification

• IPOPT, LOQO, KNITRO

open source

line search

trust region

default stopping criteria too relaxed