Science and Technology Facilities Council

Coin-HSL

A collection of HSL packages for use with IPOPT

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HSL provides a number of linear solvers that can be used in IPOPT. We provide several different ways for IPOPT users to download our codes.

Which solver?

For general use we recommend HSL_MA97. For small or highly sparse problems use MA57. For huge problems use HSL_MA86 (if factors fit in memory) or HSL_MA77 (if they don't).

Solver	Free to all	Free to academics	Problem size	Parallel	Repeatable answers	Notes
MA27	Yes	Yes	Small	No	Yes	Outdated, relatively slow. Can be downloaded as a standalone package.
MA57		Yes	Small / Medium	Threaded BLAS	Yes	
HSL_MA77		Yes	Huge	Limited	Yes	Out-of-core
HSL_MA86		Yes	Large	Highly	No*	Designed for multicore
HSL_MA97		Yes	Small / Medium / Large	Yes	Yes	Slower than HSL_MA86 on large problems

*** Note:** HSL_MA86 achieves repeatable answers in serial, however when running in parallel operations may be reordered for better performance. This leads to different (but equally valid) solutions.

Performance tips

- Try different scaling options using solver specific settings in ipopt.opt.
- For many problems scaling is not necessary. In particular try "ma57_automatic_scaling no" when using MA57 on small problems.
- See our report On the effects of scaling on the performance of Ipopt for a review of these effects.
- When using HSL_MA86 or HSL_MA97 ensure MeTiS ordering is compiled into Ipopt to maximize parallelism.

Category

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