Solving forward-looking models with PETSc and PARDISO

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Abstract

PETSc is a suite of data structures and routines for the scalable (parallel) solution of scientific applications modeled by partial differential equations. It supports MPI, and GPUs through CUDA or OpenCL, as well as hybrid MPI-GPU parallelism. It contains powerful algorithms to solve large systems of nonlinear equations and complementarity problems on modern hardware.

In this paper, we show how to use this library to solve large forward-looking models with the extended-path approach. Forward-looking models have distinct features that impose the choice of direct solvers for the linear step of the non-linear solver. We experiment in particular with PARDISO for the LU decomposition.

The potential of this approach is evaluated while solving large multi-coumtry models. Comparisons are made with algorithms currently used in Dynare.

1 See also

Balay et al. (2014) and Kuzmin et al. (2013)

References

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Andrey Kuzmin, Mathieu Luisier, and Olaf Schenk. Fast methods for computing selected elements of the greens function in massively parallel nanoelectronic device simulations. In *Euro-Par 2013 Parallel Processing*, pages 533–544. Springer, 2013.

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