Introduction to StarNEig — A Task-based Library for Solving Nonsymmetric Eigenvalue Problems

Mirko Myllykoski, Carl Christian Kjelgaard Mikkelsen
Department of Computing Science, Umeå University
SE-901 87 Umeå, Sweden
{mirkom,spock}@cs.umu.se

In this paper, we present the StarNEig library for solving dense non-symmetric (generalized) eigenvalue problems. The library is built on top of the StarPU run-time system and targets both shared and distributed memory machines. Some components of the library support GPUs. The library is currently in an early beta state and only real arithmetic is supported. Support for complex data types is planned for a future release. This paper is aimed for potential users of the library. We describe the design choices and capabilities of the library, and contrast them to existing software such as ScaLAPACK. StarNEig implements a ScaLAPACK compatibility layer that should make it easy for a new user to transition to StarNEig. We demonstrate the performance of the library with a small set of computational experiments.

Keywords: Eigenvalue problem, Task-based, Library.