Multicore Performance of Block Algebraic Iterative Reconstruction Methods - DTU Orbit
(28/02/2019)

**Multicore Performance of Block Algebraic Iterative Reconstruction Methods**

Algebraic iterative methods are routinely used for solving the ill-posed sparse linear systems arising in tomographic image reconstruction. Here we consider the algebraic reconstruction technique (ART) and the simultaneous iterative reconstruction techniques (SIRT), both of which rely on semiconvergence. Block versions of these methods, based on a partitioning of the linear system, are able to combine the fast semiconvergence of ART with the better multicore properties of SIRT. These block methods separate into two classes: those that, in each iteration, access the blocks in a sequential manner, and those that compute a result for each block in parallel and then combine these results before the next iteration. The goal of this work is to demonstrate which block methods are best suited for implementation on modern multicore computers. To compare the performance of the different block methods, we use a fixed relaxation parameter in each method, namely, the one that leads to the fastest semiconvergence. Computational results show that for multicore computers, the sequential approach is preferable.

**General information**

- **State:** Published
- **Organisations:** Department of Applied Mathematics and Computer Science, Scientific Computing
- **Contributors:** Sørensen, H. H. B., Hansen, P. C.
- **Pages:** C524-C546
- **Publication date:** 2014
- **Peer-reviewed:** Yes

**Publication information**

- **Journal:** SIAM Journal on Scientific Computing
- **Volume:** 36
- **Issue number:** 5
- **ISSN (Print):** 1064-8275
- **Ratings:**
  - BFI (2019): BFI-level 2
  - Web of Science (2019): Indexed yes
  - BFI (2018): BFI-level 2
  - Web of Science (2018): Indexed yes
  - BFI (2017): BFI-level 2
  - Scopus rating (2017): CiteScore 2.61 SJR 1.973 SNIP 1.612
  - Web of Science (2017): Impact factor 2.046
  - Web of Science (2017): Indexed yes
  - BFI (2016): BFI-level 2
  - Scopus rating (2016): CiteScore 2.45 SJR 1.992 SNIP 1.734
  - Web of Science (2016): Impact factor 2.195
  - Web of Science (2016): Indexed yes
  - BFI (2015): BFI-level 2
  - Scopus rating (2015): CiteScore 2.3 SJR 1.963 SNIP 1.844
  - Web of Science (2015): Impact factor 1.792
  - Web of Science (2015): Indexed yes
  - BFI (2014): BFI-level 2
  - Scopus rating (2014): CiteScore 2.43 SJR 1.872 SNIP 2.022
  - Web of Science (2014): Impact factor 1.854
  - Web of Science (2014): Indexed yes
  - BFI (2013): BFI-level 2
  - Scopus rating (2013): CiteScore 2.72 SJR 1.928 SNIP 2.136
  - Web of Science (2013): Impact factor 1.94
  - ISI indexed (2013): ISI indexed yes
  - BFI (2012): BFI-level 2
  - Scopus rating (2012): CiteScore 2.19 SJR 1.739 SNIP 1.77
  - Web of Science (2012): Impact factor 1.949
  - ISI indexed (2012): ISI indexed yes
  - Web of Science (2012): Indexed yes
  - BFI (2011): BFI-level 2