Fast and Efficient Parallel Breadth-First Search with Power-law Graph Transformation

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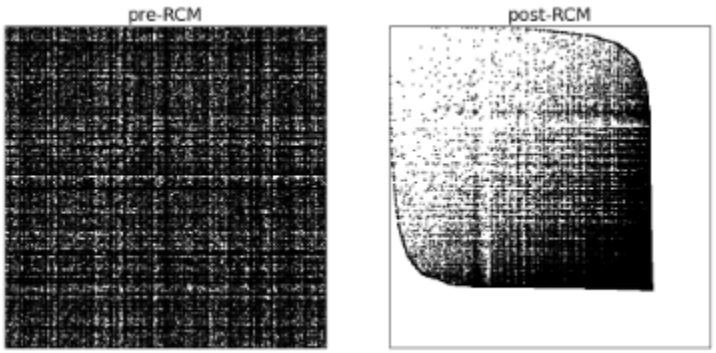
Frontiers of Computer Science, DOI: 10.1007/s11704-021-1004-6

Problems & Ideas

- Problems of Graph Computing.
  - random memory accesses
  - inefficient use of cache
  - irregular degree distribution
- Ideas:
  - reordering
  - Dynamic load balance



Main Contributions

- **RCM reordering**
- **Dynamic load balance**
- **SIMD optimization**

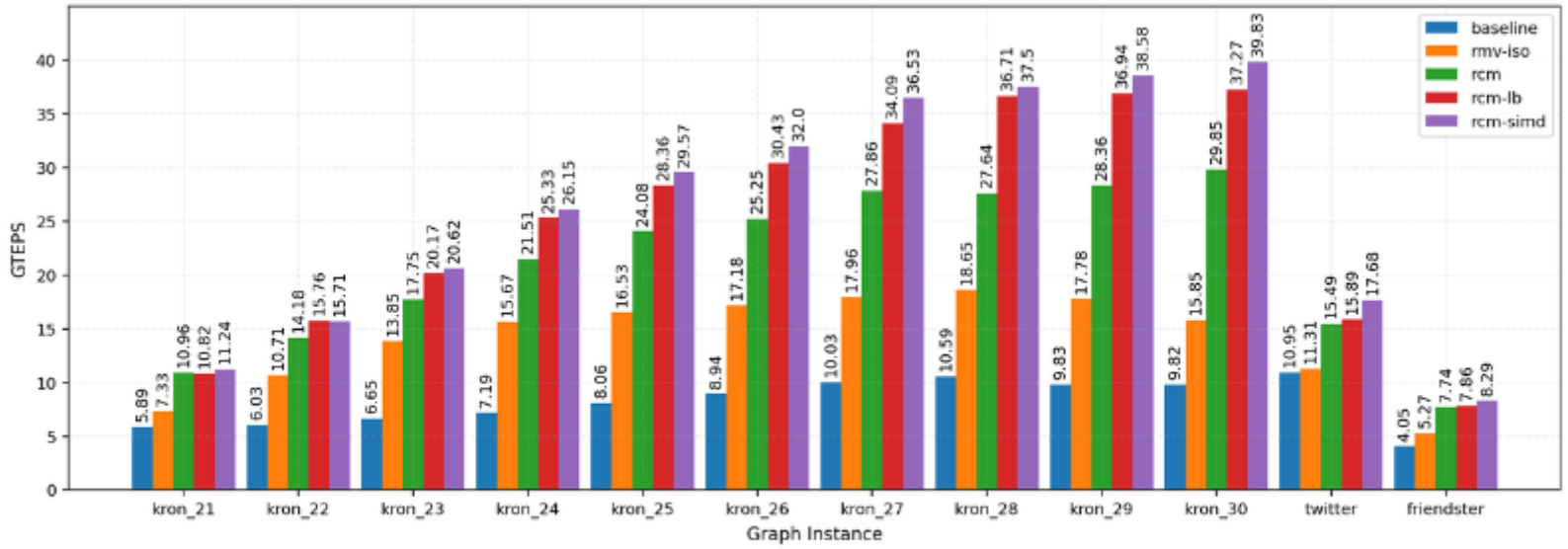


Fig. 4 Ablation experiments on different optimizations. *1. baseline: hybrid bfs; 2.rmv-iso: baseline + remove isolated vertices; 3.rcm: rmv-iso +rcm; 4.rcm-lb: rcm+load balance; 5.rcm-simd: rcm-lb + simd.*