Developing Linear Algebra Codes on Modern Processors: Emerging Research and Opportunities

Part of the Advances in Systems Analysis, Software Engineering, and High Performance Computing Book Series

Sandra Catalán Pallarés (Universidad Complutense de Madrid, Spain), Pedro Valero-Lara (Cray Inc., USA) et al.

Description:

Optimized linear algebra (LA) libraries that are able to exploit the underlying hardware are always of interest in the high-performance computing community. The implementation of LA software has evolved along with computer architecture, while the specification remains unaltered almost from the beginning. It is important to differentiate between the specification of LA libraries and their implementation. Because LA libraries pursue high performance, the implementation for a given architecture needs to be optimized for it specifically. However, the type of operations included in the libraries, the input/output parameters, and the data types to be handled are common to all of them. This is why, while the specification remains constant, the implementation evolves with the creation of new architectures.

Developing Linear Algebra Codes on Modern Processors: Emerging Research and Opportunities presents the main characteristics of LA libraries, showing the differences between the standards for sparse and dense versions. It further explores relevant linear algebra problems and shows, in a clear and understandable way, how to solve them using different computer architectures. Covering topics such as programming models, batched computing, and distributed memory platforms, this premier reference source is an excellent resource for programmers, computer scientists, engineers, students and faculty of higher education, librarians, researchers, and academicians.
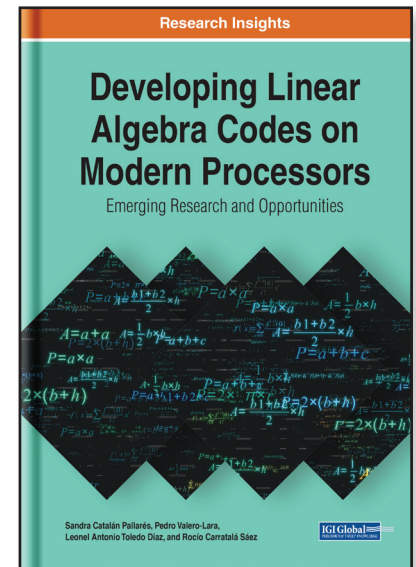
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Topics Covered:

Architectures	Human Brain Simulation
Batched Computing	Linear Algebra
Dense Linear Algebra	Parallelism
Distributed Memory Platforms	Programming Models
H-Matrices	Sparse Linear Algebra

Subject: Computer Science and Information Technology	**Classification:** Research Insights
Readership Level: Advanced-Academic Level (Research Recommended)	**Research Suitable for:** Advanced Undergraduate Students; Graduate Students; Researchers; Academicians; Professionals; Practitioners