MAX-PLANCK-INSTITUT
FÜR DYNAMIK KOMPLEXER
TECHNISCHER SYSTEME
MAGDEBURG

CSC Seminar

SPEAKER

Jonas Schulze

TITLE

Diagonally Addressed Matrix Nicknack: Sparse Matrix Vector Product

ABSTRACT

We suggest a technique to reduce the storage size of sparse matrices at no loss of information, which exploits the typically low matrix bandwidth of matrices arising in applications. We call our technique Diagonally-Addressed (DA) storage. For memory-bound algorithms, a reduction in traffic has direct benefits for both classical (fixed-precision) and multi-precision algorithms. In particular, we demonstrate how to apply DA storage to the Compressed Sparse Rows (CSR) format and compare the performance in computing the Sparse Matrix Vector (SpMV) product, which is a basic building block of many iterative algorithms in scientific computing. We observe a single-threaded performance uplift of up to 15% of 16-bit indices over 32-bit ones, when the traffic exceeds the size of the last-level CPU cache. Ongoing efforts are concerned with multi-threading and vectorization.

Tuesday, May 23, 2023 at 2 pm
seminar room Prigogine