Mixed precision computations in theory and practice

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Short Description

Mixed precision hardware has recently become commercially available, and more than 25% of the supercomputers in the TOP500 list now have mixed precision capabilities. Using low precision can be advantageous in reducing the computation and communication costs of algorithms, with proportional savings in energy. However, low precision computation can also lead to loss of accuracy and algorithm instability. There are thus many current efforts toward developing mixed precision algorithms in various fields, which selectively use different precisions in different parts of the computation in a way that achieves both performance improvement and acceptable numerical behavior. This mini-symposium will consist of talks from eight prominent researchers in this area, with topics spanning theoretical error analysis, algorithm development, performance evaluation, and the use of mixed precision in real applications.