

Solving linear systems on GPU-based systems

Florent LOPEZ

Ansys, France

Abstract

For a great variety of applications involving the use of Ansys products, computer-aided simulation often requires the solution of large sparse linear systems which can be computationally and numerically challenging to solve. On another hand, hardware architectures evolve rapidly and offer great opportunities to dramatically improve the time to solution if we manage to design specific algorithmic strategies and computational kernels to efficiently use these new architectures. For example, in the last few years, it has become more and more common to equip modern HPC systems with GPUs offering far greater computational throughput and memory bandwidth compared to traditional CPUs. In this talk we will discuss various strategies, employed in the MUMPS and Ansys sparse direct solvers, used to exploit the great potential behind GPU-based systems.