

An introduction to the Fast Multipole Method

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The talk will provide a gentle introduction to fast summation schemes for efficiently evaluating all pairwise interactions between n particles. We will focus on electrostatic interactions (and other problems modeled by the Laplace equation), and will briefly discuss how the ideas can be extended to other problems modeled by elliptic PDEs such as, e.g., time harmonic wave propagation problems. Most of the talk will be a review of well established techniques such as the Fast Multipole Method and Barnes-Hut, but we will also describe some perhaps less well known ideas for how to rapidly solve potential problems on periodic lattices via lattice fundamental solutions.