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RECENT ADVANCES IN NUMERICAL MODELLING AND SIMULATION

Parallel Computing for Particle Systems and Future Challenges

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Parallel computing is nowadays an indispensable tool for large scale computations in various fields and scientific domains. The first part of the lecture will give an introduction to state-of-the-art parallel computing in the field of particle simulations. In contrast to mesh based algorithms particles are usually free to move in the system and have to be efficiently administered by the processors. Various parallelisation methods are addressed, which have their advantage in different types of applications. For strongly inhomogeneous and time dependent systems, load balancing strategies are presented and discussed.

The second part will give an outlook to future computing, especially to the challenge of exascale computing, which is foreseen to succeed the current era of petascale computing. Some recent advances and trends will be discussed.