The CERN Accelerator School

Numerical Methods for Analysis, Design and Modelling of Particle accelerators

Thessaloniki (Greece)
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Hotel Nikopolis

The complexity of particle accelerators in terms of design and technologies is ever increasing, be it accelerators for particle research or industrial and medical applications. During preparatory studies of the design, construction and operation of these accelerators computing plays a dominant role.

On one side advances in computing power, new concepts like parallel computing and on the other side advanced algorithms and modern developments such as machine learning are presently active research and development fields used to boost the design and the technologies of any accelerator.

In the proposed course the lectures will be focused on the physics and numerical concepts on which modern computing tools are based.

The course is organized in two main topics: computing and simulation of the beam dynamics, the design, simulation and performance optimization of accelerator equipment (such as e.g. magnets, cavities and beam instrumentation). Both topics are closely related, the concern for impedance of the vacuum system as seen by the beam is a very prominent example.

This course will be of interest for a wide range of physicists and engineers working on accelerators and the level of the course will be quite advanced. It is therefor mandatory to have at least assisted to the introductory CAS course or an equivalent level of training.

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