Introduction to domain decomposition methods

Tommaso Vanzan*[1]

[1]Ecole Polytecnique Federale de Lausanne – Switzerland

Abstract

Domain decomposition methods are effective divide and conquer algorithms to solve large scale partial differential equations on modern high performance clusters. They are based on the idea of decomposing the computational domain into several subdomains, where the partial differential equation can be solved more easily and in parallel. The local solutions are then recombined together, and the process is iterated until convergence is reached. The first part of the mini-course will introduce the most classical one-level overlapping and nonoverlapping methods, recalling convergence results, discrete and continuous analogs and implementation details. In the second part, we will briefly touch more advanced topics such as multi-level methods and applications to multi-physics problems.

*Speaker