
A mini-course on multigrid methods

Hardik Kothari*¹

¹Università della Svizzera Italiana – Switzerland

Abstract

Multigrid methods are some of the most powerful techniques for solving linear systems of equations arising from the discretization of partial differential equations (PDEs). In this mini-course, we will introduce fundamental concepts of multigrid methods, including their historical developments, mathematical foundations, and implementation. We will discuss in detail the multigrid algorithm and the key components of the method, namely: coarse grids, transfer operators, and the concepts of smoothers. In the later part of the course, we will extend the concepts from linear multigrid methods to their nonlinear counterparts and discuss the necessary modifications.

*Speaker