Computational homogenization of heterogeneous materials with finite elements

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Abstrak

This monograph provides a concise overview of the main theoretical and numerical tools to solve homogenization problems in solids with finite elements. Starting from simple cases (linear thermal case) the problems are progressively complexified to finish with nonlinear problems. The book is not an overview of current research in that field, but a course book, and summarizes established knowledge in this area such that students or researchers who would like to start working on this subject will acquire the basics without any preliminary knowledge about homogenization. More specifically, the book is written with the objective of practical implementation of the methodologies in simple programs such as Matlab. The presentation is kept at a level where no deep mathematics are required.