

Preface

The subject of this book is to present a critical review on the development and application of hygrothermal analysis methods to simulate the coupled transport processes of Heat, Air, and Moisture (HAM) transfer for one or multidimensional cases.

During the past few decades, there has been quite some development and increased professional use of tools to simulate some of the processes that are involved in the analysis of HAM conditions in individual constructions that form the building envelope or whole building. However, as the vast majority of the hygrothermal models, available in literature, are not readily available to the public outside of the organization where they were developed, in this analysis we only consider the 14 hygrothermal modeling tools that are available to the public in general.

The special features of this book are: (a) a state-of-the-art of numerical simulation tools applied to building physics; (b) the boundary conditions importance; (c) experimental methods for the measurement of relevant material properties, and (d) the numerical investigation and application.

The main benefit of the book is that it discusses all the topics related to numerical simulation tools in building elements and components (including state-of-the-art and applications) and presents some of the most important theoretical and numerical developments in building physics, providing a self-contained major reference that is appealing to both the scientists and the engineers. At the same time, this book will be going to the encounter of a variety of scientific and engineering disciplines, such as civil and mechanical engineering, architecture, etc. The book is divided into several chapters that intend to be a synthesis of the current state of knowledge for benefit of professional colleagues.

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