

PREFACE

The purpose of this book is to introduce hands-on model building and solving with COMSOL Multiphysics® software version 4 to scientists, engineers, and others interested in exploring the behavior of physical device structures on a computer (virtual prototype), before going to the workshop or laboratory and trying to build the whatever-it-is (real prototype).

The models presented herein are built within the context of the laws of the physical world (applied physics) and are explored in light of First Principle Analysis techniques. As with any other method of problem solution, the information contained through the solutions to these computer simulations (virtual prototypes) is only as accurate as the materials properties values and the fundamental assumptions employed to build these simulations.

The primary advantage of the combination of computer simulation (virtual prototyping) and First Principles Analysis to explore artifacts (device structures) is that the modeler can try as many different approaches to the solution of the same underlying problem as are needed in order to get it right (or close thereto) before fabrication of the device components and the assembled device (real prototype) in the workshop or laboratory for the first time.

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