

Foreword

Earthquake engineers are often criticized by others for being too constrained by old traditions. We are told that we have a limited vocabulary consisting of beams, columns, walls, and few other words; rather narrow means of analyses; and a restricted vision of possibilities for evaluation and retrofit of structures. Such criticism, of course, is much more descriptive of the ignorance of those who assert it than it is reflective of the current status, vision, and complexity of earthquake engineering research and practice. Over the past several decades, earthquake engineers have advanced the field of applied physics by leaps and bounds. Earthquake engineers developed the finite element analysis currently used by all branches of science and engineering; pioneered the response spectrum concept and visualized and refined the techniques for analysis of nonlinear systems.

If something is true, however, about the above-mentioned criticism, it is the fact that earthquake engineers have not been very effective in relaying their technical achievements to those outside their field. In other words, we have been preaching to the converted. As a result, we have been at least partially culpable for the myths that demean our field and limit our recruitment of the brightest, most technically savvy young minds who are about to enter various fields of science and technology.

This book represents a critical turning point because it demonstrates how the most current, advanced, and revolutionary computational techniques can be put to effective use in earthquake engineering not only to satisfy our intellectual aspirations, but to save precious lives and limbs. As such, it is not only useful to the practitioners and researchers of earthquake engineering but it is also invaluable to demonstrate the enormous capacity of earthquake engineering to those who may become its future leaders. If one is interested in computational challenges with an eye on solving life-threatening problems, one does not need to ponder far away from earthquake engineering.

As co-editors for this book, professors Nikos D. Lagaros and Yiannis Tsompanakis should be congratulated for achieving the monumental task of engaging experts from all over the world to produce this book with great success. The book is filled with methodologies and techniques that can motivate young researchers to employ them to solve their unique problems and can be useful to practitioners to respond to their everyday challenges. No other book contains such a comprehensive coverage of techniques such as application of neural networks, fuzzy logic theory, and evolutionary tools such as genetic algorithms, and other modern optimization methods, all engaged to solve various earthquake engineering problems.

This book is bound to find a prominent place on the bookshelf of every serious student, researcher and practitioner of earthquake engineering. And for that I salute the editors and their distinguished contributors for a job well done.

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