

Preface

About 10 years ago, *Mixed and Hybrid Finite Element Methods* by F. Brezzi and M. Fortin went out of print and we were asked to allow a second printing. The world had evolved and we thought that a revision was due and that some topics had to be added to the book. For this task, D. Boffi joined the team and we began to write the improved version. It turned out that this meant doubling the number of pages and essentially producing a new book.

We hope that the result is now a better, self-contained, presentation of the underlying issues, either from linear algebra or from functional analysis. The presentation of the basic results should now be accessible to readers which are not familiar with functional analysis, although willing to invest some effort in understanding mathematical issues.

The scope of finite element approximations was extended to $H(\underline{\text{curl}}; \Omega)$ and the three-dimensional cases are now fully covered. Tensor elements were also considered for elasticity problems. The approximation of eigenvalue problems has been included as well.

Moreover, new applications have been introduced: mixed elasticity and electromagnetism. New results have been added to already treated applications such as the Stokes problem or mixed formulations of elliptic problems. Even so, some topics have been merely addressed. This is, for example, the case of a posteriori estimators, Discontinuous Galerkin methods and new developments on virtual elements which would have required a long development in an already (too?) long book. Indeed, each of these topics could be the subject of a whole book. The analysis of mixed methods is also relevant to many applications such as mortar methods or contact problems which were also reduced to a few remarks. This does not mean that these are not important. We had to stop somewhere. Indeed, we took a long time to do so.

We thus hope that this book will provide a good starting point for all those interested in mixed (and related) finite element methods.

Pavia, Italy
Québec, Canada

D. Boffi and F. Brezzi
M. Fortin

Mixed Finite Element Methods and Applications

Boffi, D.; Brezzi, F.; Fortin, M.

2013, XIV, 685 p., Hardcover

ISBN: 978-3-642-36518-8