

Changelog for the monograph  
*The Gradient Discretisation Method*,  
deposited on the hal server at  
<https://hal.archives-ouvertes.fr/hal-01382358>

## V4

Many changes, following thorough reports from the referees, whom we warmly thanks for their interesting comments. Resulted in more than 80 additional pages. Main changes are:

- Expansion of the literature review, in particular in Chapter 1.
- Re-organisation of Chapters 2 and 3, to present gradient discretisations and gradient schemes first for Dirichlet in Chapter 2, and then extend to other BCs in Chapter 3. Chapter 2 is now more self-contained.
- Extraction of the generic discrete functional analysis for time-dependent problems from Chapter 4 to Appendix C.
- Displacement of  $W^{2,p}$  estimates for LLE GDs from the appendix to Section 7.4 in Chapter 7.
- Complete re-writing of Chapter 9 on non-conforming methods. We now start from a generic setting that contains all non-conforming schemes, including high-order methods, before developing more specifically the non-conforming  $\mathbb{P}_k$  methods.
- Complete re-writing of Chapter 10 on mixed methods. As for Chapter 9, we now have a generic setting before specific results on  $\mathbb{RT}_k$  methods.
- Addition of a new chapter, Chapter 11, on discontinuous Galerkin methods of any order.
- Addition of Appendix A presenting an abstract setting for gradient discretisations. This setting enables us to give unified definitions and proofs for most boundary conditions at once. However, Chapter 2 (on Dirichlet boundary conditions) remains fully self-contained, and Chapter 3 (on the other boundary conditions) can be read without reference to Appendix A if the reader is not interested in the detailed proofs.

- The notion of compactness for Neumann and Fourier boundary conditions has been modified to request the compactness of the trace for the norm topology (which is natural). As a consequence, in Appendix B.3.3 we now prove the compactness of the reconstructed trace  $\mathbb{T}_{\mathfrak{T}}$ , in order for the control by a polytopal toolbox to imply the compactness of the trace  $\mathbb{T}_{\mathcal{D}}$  appearing in gradient discretisations.
- Some numerical results have been gathered in the last chapter of the appendix, in order to illustrate the theoretical properties of the methods.

### V3

- Change boxes for definitions.
- Changed subtitle.
- Modified preface and introduction to emphasise on one of the key features of the GDM, which is the convergence analysis for non-linear problems.
- Updated some references.

### V2

- Typos.
- Added index.

### V1

Initial submission.