

SOME REMARKS ON EIGENVALUE APPROXIMATION ARISING  
FROM PARTIAL DIFFERENTIAL EQUATIONS

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The aim of this talk is to review some topics related to the approximation of eigenvalues and eigenfunctions arising from partial differential equations, which have been the object of two recent surveys [1, 2].

We will discuss in particular the Hodge–Laplace eigenvalue problem in the framework of differential forms. After recalling the main issues concerning its analysis, we focus on some numerical examples with a particular interest in multiple eigensolutions. We will show how a double eigenvalue can be associated to eigenfunctions with different regularity; in this case, there are two discrete eigenvalues converging towards the common limit with different orders, which depend on the smoothness of the corresponding eigenfunctions.

## References

- [1] D. Boffi, *Finite element approximation of eigenvalue problems*, Acta Numer., 19 (2010), pp. 1–120.
- [2] D. Boffi, F. Gardini, and L. Gastaldi, *Some remarks on eigenvalue approximation by finite elements*, submitted.