

# Multiplier techniques and eigenfunction estimates for discrete Laplace operators

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In this talk, we recall several results on spectral estimates of the form  $\|e_\lambda\|_{L^p} \leq \lambda^{\sigma(p)}$ , where  $e_\lambda$  are the eigenfunctions corresponding to the eigenvalue  $\lambda$  for the continuous Laplace operator on some domains  $\Omega \in \mathbb{R}^d$ . We also consider discrete versions of these estimates associated to finite difference approximations on 1-d uniform grids, as well as for nonuniform ones which become progressively finer/coarser around some point of the interval. Our results describe how exponents  $\sigma(p)$  change for each of these meshes. We also explain the relation between these results and the ones we obtained for the discrete wave equation in [1].

## References

- [1] Ervedoza S., Marica A., Zuazua E., Numerical meshes ensuring uniform observability of 1d waves: construction and analysis, IMA J. Numer. Anal., 36(2)(2016), 503–542.