WEIGHTS AND APPLICATIONS IN NUMERICS

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Abstract. The use of weights and weighted norm inequalities has a rich history in harmonic analysis and the study of regularity properties to solutions of partial differential equations (PDE). Starting from classical results, we will present an overview of the application of some of these ideas to the numerical analysis of PDEs. Our main attention will be on some recent results concerning the use of weights in fractional diffusion, problems with singular data and some degenerate/singular PDE problems. Although these seem as disparate and unrelated applications, it is remarkable that the only structural assumption on the weight is that it belongs to a so-called Muckenhoupt A_p class, which has been thoroughly studied in harmonic analysis since the 1970's.

Keywords: Muckenhoupt weights, weighted estimates, singular sources, fractional diffusion.

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