

NON-SINGULAR AND SINGULAR INTEGRAL INEQUALITIES AND APPLICATIONS

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We will start by discussing some basic inequalities in analysis, which estimate an integral of a certain product of functions by products of Lebesgue norms of the functions involved. Examples include Hoelder's inequality, Young's convolution inequality, and the Loomis-Whitney inequality. We will also consider certain geometric and combinatorial consequences of some of these inequalities. We will proceed by investigating some cases which arise when we replace one of the functions in the initial integral by a so-called singular integral kernel. We will discuss the corresponding inequalities in the case of such singular integrals. Finally, we shall talk about some combinatorial consequences of the inequalities for certain singular integrals and discuss some related open problems.