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Some Braided Functional Inequalities

Several sharp inequalities comparing weighted L^p norms of a function $f : \mathbb{R}^n \to \mathbb{C}$ and its derivatives naturally extend with the same sharp constant to maps $u : \mathbb{R}^n \to A_Q(\mathbb{C})$, where $A_Q(\mathbb{C})$ is the space of unordered Q-tuples of complex numbers. In this talk we explore how topological constraints on the graphs of such maps can affect sharp constants and extremizers. We focus on Hardy and, more generally, Caffarelli-Kohn-Nirenberg inequalities. Broadly speaking, we explore the effects of generalizing known functional inequalities to inequalities for multiply-valued functions whose sheets suitably braid. AI disclaimer: these results were developed with the assistance of AI tools.