

A summary of my research

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Outline of my research

Functional inequalities express an inclusion relation between functional spaces.

Not only that it is one of fundamental tools to study differential equations. Therefore, it is important. I study explicit value and minimization problem related to best constant of Hardy type inequalities and several functional inequalities. And I study existence of solution to elliptic equations. Recently, I am interested in derivation of limiting form of functional inequality, an improved Hardy-Sobolev inequality and the sharp critical Rellich inequality.

Details

It is known that the classical Hardy-Sobolev inequality on the unit ball can be improved by adding a potential function with the boundary singularity only for radial functions. Actually, the improved Hardy-Sobolev inequality on the unit ball is equivalent to the classical Hardy-Sobolev inequality on the whole space only for radial functions via some transformation. Therefore the best constant, the attainability and the scale invariance structure of the improved Hardy-Sobolev inequality can be derived from the classical one via the transformation. In the paper [2], we study the improved Hardy-Sobolev inequality for any functions. In the paper [3], we study some limiting procedure for the Hardy type inequalities and the Poincare inequality. In the paper [1], we study the explicit best constant and the attainability.