

PhD Defense
Department of Mathematics

Liuyu Qin
(MU, Math)

Adams inequality with exact growth condition on \mathbb{R}^n and Heisenberg group

Advisor: Carlo Morpurgo (MU, Math)

ABSTRACT

In this thesis we prove sharp Adams inequality with exact growth condition for the Riesz potential as well as the more general strictly Riesz-like potentials on \mathbb{R}^n . Then we derive the Moser-Trudinger type inequality with exact growth condition for fractional Laplacians with arbitrary $0 < \alpha < n$, higher order gradients and homogeneous elliptic differential operators. Next we give an application to a quasilinear elliptic equation, and prove the existence of ground state solution of this equation. Lastly, we extend our result to the Heisenberg group. We derive a sharp Adams inequality with critical growth condition on \mathbb{H}^n for integral operators whose kernels are strictly Riesz-like on \mathbb{H}^n . As a consequence we derive the corresponding sharp Moser-Trudinger inequalities with exact growth condition for the powers of sublaplacian $(-\mathcal{L}_0)^{\alpha/2}$ when α is an even integer, and for the subgradient $\nabla_{\mathbb{H}^n}$.