中国科学院数学与系统科学研究院应用数学所

偏微分方程及其应用中心

学术报告

报告题目： Method of scaling spheres: Liouville theorems in general bounded or unbounded domains, blowing-up analysis on non-C^1 domains and other applications

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摘　　要： In this talk, we aim to introduce the method of scaling spheres (MSS) as a unified approach to Liouville theorems on general domains and apply it to establish Liouville theorems on arbitrary unbounded or bounded MSS applicable domains for general ⩽n-th order PDEs and integral equations without translation invariance or with singularities. The set of MSS applicable domains includes any unbounded or bounded generalized radially convex domains and any complementary sets of their closures, which is invariant under Kelvin transforms and is the maximal collection of domains such that the MSS works. For instance, R^n, R^n_+, balls, bounded or unbounded cone-like domains, exterior domains, convex domains, star-shaped domains and all the complements of their closures are MSS applicable domains. One should note that, MSS applicable domains is to the MSS what convex domains (at least in one direction) is to the famous method of moving planes. As applications, we derive a priori estimates and hence existence of positive solutions from the boundary Hölder estimates for ⩽n-th order elliptic equations by applying the blowing-up argument on domains with blowing-up cone boundary (BCB domains for short). After the blowing-up procedure, the BCB domains allow the limiting shape of the domain to be a cone (half space is a cone). While the classical blowing-up techniques in previous works work on C^1-smooth domains, we are able to apply blowing-up analysis on more general BCB domains on which the boundary Hölder estimates hold (can be guaranteed by uniform exterior cone property etc).