

Positive Harmonic functions on nonsmooth domains

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Abstract

This course is organised along the following lines.

1. Overview

The Martin boundaries for general domains, the boundary Harnack principle, nonsmooth domains (interior conditions and exterior conditions), the common property between John domains and domains with the capacity density condition.

2. Uniform domains and the uniform boundary Harnack principle

By the box argument we prove the uniform boundary Harnack principle; as a result we identify the Martin boundary.

3. John domains and the weak boundary Harnack principle

We introduce the notion of a system of local reference points and prove the weak boundary Harnack principle by the Domar argument. We observe that the number of minimal Martin boundary points over a Euclidean boundary point is finite.

4. Equivalence between the Carleson estimate and the boundary Harnack principle

We observe the global (local) Carleson estimate and the global (local) boundary Harnack principle if we define these notions appropriately. We establish the global boundary Harnack principle for Hölder domains and domains with the quasihyperbolic boundary condition.