Master’s thesis proposal

Boundary rigidity: geometric approaches

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The goal of this master’s thesis is to study the relationships between the boundary geometry of a domain and the geometry within this domain. A typical question is:

**Question.** When can the metric on a domain be recovered from measuring distances between boundary points only?

Such a problem naturally arises in geophysics, medical imaging, etc. and has extensively been studied from the PDE viewpoint.

In this master’s thesis, we will look at alternative geometrical approaches developed by C. Croke, J.-P. Otal and D. Burago-S. Ivanov. A first result independently proved by the first two authors using different techniques asserts the following:

**Theorem.** A negatively curved metric on a disk is uniquely determined, up to isometry, by the restriction of the distance function to the boundary of the disk.

A closely related problem consists in deriving bounds on the volume of a geometrical object from estimates on the distance function.

**References.**


