



THE HONG KONG UNIVERSITY OF SCIENCE & TECHNOLOGY

Department of Mathematics

SEMINAR ON PDE

Constraint maps with free boundaries

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Abstract

In this talk, we shall consider maps that minimize the Dirichlet energy subject to constraints on their image. We call these maps (minimizing) constraint maps. In the manifold level, these maps are precisely harmonic maps into manifolds-with-boundary. On the other hand, the minimization problem can also be considered as canonical extension of the classical obstacle problem to the vectorial setting. The constraint maps were considered several decades ago, mainly by F. Duzaar and M. Fuchs, who established the optimal partial regularity theory. The observations were aligned with the development of the theory for harmonic maps. What differentiates the constraint maps from the (usual) harmonic maps (into manifolds without boundary) is the presence of free boundaries. Although they were studied many years ago, only basic properties of free boundaries were studied for the constraint maps. Recently, together with A. Figalli and H. Shahgholian, I took a closer look, from the perspective of free boundary problems, at the behavior of the mappings in the vicinity of their free boundaries. Our result shows some interesting (vectorial) features, which do not (and cannot) arise in the scalar obstacle problems. In this talk, I will give a brief overview on the development and the characters of the constraint maps, and present the recent result, and if time allows, some interesting, new problems in this direction. The talk will be based on the joint works by A. Figalli, A. Guerra and H. Shahgholian.

Date: 14 September 2023 (Thursday)

Time: 4:00pm

Zoom Meeting: <https://hkust.zoom.us/j/92041132301> (Passcode: 393276)

All are Welcome!