

On the Parabolic Fractional Obstacle Problem

Emmanouil Milakis

Abstract

Obstacle problems are characterized by the fact that the solution must satisfy unilateral constraint i.e. must remain, on its domain of definition or part of it, above a given function the so called obstacle. Parabolic obstacle problems, i.e. when the involved operators are of parabolic type, can be formulated in various ways such as a system of inequalities, variational inequalities or Hamilton-Jacobi equation. In the present talk, I will briefly explain the formulation of elliptic and parabolic obstacle problems and will connect them with the corresponding extension problems for the fractional Laplacian and fractional Heat. Then I will present some of our recent result on the so-called non-dynamic parabolic Fractional Obstacle Problem. I will discuss how to obtain higher regularity as well as optimal regularity of the space derivatives of the solution. Furthermore, at free boundary points of positive parabolic density, I will describe how the Hölder continuity of the time derivative is obtained. Based on joint works with Ioannis Athanasopoulos and Luis Caffarelli.

Emmanouil Milakis

University of Cyprus

Department of Mathematics & Statistics

P.O. Box 20537

Nicosia, CY- 1678 CYPRUS

`emilakis@ucy.ac.cy`