

SEMINAR OF ANALYSIS

FRIDAY 01 MARCH 2019 - ROOM: MA B1 11 at 2.00 pm

*Dr. Paul **PEGON*** (université de Paris-Dauphine, France)

will present a seminar entitled:

« A Fractal Optimal Shape in Branched Transport »

Abstract:

The branched transport problem consists in connecting two measures of same mass through a network minimizing a certain cost. Typically if a mass m moves over a distance L , it is of the form $m L^\alpha$ where α is an exponent between 0 and 1. I will shortly introduce the theory of branched transport and the so-called landscape function, essential to the study of related variational problems. I will then address the following question: what is the set of unit volume which can be best irrigated starting from a single source at the origin, in the sense of branched transport? We formulate this question as a shape optimization problem whose solutions may be thought as "unit balls" for branched transport. Our main motivation for considering this problem is to exhibit fractal features of branched transport, the boundary of such balls being natural candidates. Indeed, we are able to get an upper bound on the Minkowski dimension of the boundary, which is non-integer and conjectured to be its exact dimension. I will finally present a first attempt to compute numerically an approximate optimal shape, using a Modica-Mortola approximation of branched transport introduced some years ago by Oudet and Santambrogio. This is a joint work with F. Santambrogio and Q. Xia.

Lausanne, February 20, 2019

MC/ac

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