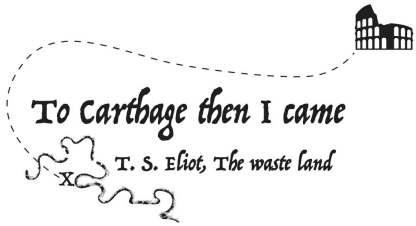
Alfonso Sorrentino
Università di Roma Tor Vergata



Tuesday 17th May
10:30 (Tunis time – GMT+1, UTC+1)

The Hamilton–Jacobi equation on networks: weak KAM and Aubry–Mather theories

Over the last years there has been an increasing interest in the study of the Hamilton–Jacobi Equation on networks and related questions. These problems, in fact, involve a number of subtle theoretical issues and have a great impact on the applications in various fields, for example, data transmission, traffic management problems, etc… While locally — i.e., on each branch of the network (arcs) —, the study reduces to the analysis of 1-dimensional problems, the main difficulties arise in matching together the information converging at the juncture of two or more arcs, and relating the local analysis at a juncture with the global structure/topology of the network.
In this talk I shall discuss several results related to the global analysis of this problem, obtained in collaboration with Antonio Siconolfi (Univ. of Rome La Sapienza); more specifically, we developed analogs of the so-called Weak KAM theory and Aubry–Mather theory in this setting. The salient point of our approach is to associate the network with an abstract graph, encoding all of the information on the complexity of the network, and relate the differential equation to a discrete functional equation on the graph.