Seminario de Análisis y Aplicaciones

Viernes 28 de Abril 2023,

11:30-12:30, Aula 520, UAM

Giovanna Citti

Università di Bologna & Accademia dei Lincei

A sub-Riemannian model of hand area of the motor cortex

Resumen:

In this seminar I will present a mathematical model of the motor cortex, joint work with Mazzetti and Sarti. The first studies of this area, due to Georgopoulos, proved that neurons are sensible to suitable kinematic variables. More recently, it has been experimentally proved by Churchland et alii and by Harpaz et alii that neurons are indeed selective to short trajectories of the hand, called movement fragments. These fragments can be obtained via a clustering procedure directly on the neural activity.

We consider here the sub-Riemannian space defined by the observed kinematic variables and the differential constraints between them and recover the movement fragments as integral curves of the considered structure. With a geometric spectral clustering method, we re-obtain the previous cortical decomposition only using kinematic variables. In this way we prove that these variables are sufficient to describe the processing in this area.