

Exact Sciences Seminar
Wednesday 09.01.2019 on 16:00-17:00, Ficus 304

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Estimating the activity and spectrum of a nuclear source.

Abstract

A typical nuclear source emits photons according to some Poissonian process, which parameter is called the activity of the source; moreover the each photon individual energy is drawn from some distribution called the spectrum of a source.

A photonic detector produces a random electrical pulse each time a photon interacts with it. But the signal we obtain is generally made of overlapping pulses, which means that estimating the activity and spectrum, especially for high activities, is a highly non trivial problem.

We intend to introduce the mathematical setting of the problem, in a first part. As a second part, we shall talk about the utility of sparse regression approaches for our problem, and mention some results concerning the activity. We will introduce the LASSO regressor, and explain its relation with maximal likelihood estimation.

Finally, we shall introduce the general problem of estimating the model space, and outline an EM estimation approach for the spectrum estimation.

**Coordinators: Dr. G. Ben-Simon, Prof. I. Goldman, Prof. Y. Stancescu,
Prof. D. Fishelov and Dr. Neta Rabin**