

CREST - GENES

Cours doctoraux 2023

PROPHET INEQUALITIES

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SCHEDULE	Tuesday 11th April 2023	9h30--12h00 and 15h15-17h45	Amphi 250
	Thursday 13th April 2023	9h30--12h00 and 14h00--16h30	

Abstract.

A prophet inequality refers to the existence of an online algorithm for a stochastic optimization problem whose outcome is, in expectation, close to that of a prophet, who can see the input in advance. The study of prophet inequalities has been very active since the classic work of Krengel and Sucheston, who established the single-item case. They proved that a gambler facing a finite sequence of non-negative independent random variables and who is allowed to stop the sequence at any time, can obtain, in expectation, at least half as much reward as a prophet who knows the values of each random variable and can choose the largest. Following this classic theorem from the 70s, many results have been obtained for several related optimal stopping problems. Moreover, the recently uncovered connection between prophet inequalities and posted price mechanisms, has given the area a new surge. In this short course, we will cover not only some of the classic results in prophet inequalities but also new approaches and variants of the problem. These include data-driven approaches to prophet inequalities, combinatorial prophet inequalities, and online combinatorial auctions.