



Analysis Seminar

Title: Systematic risk in pools

Speaker: Hirbod Assa

Date: Tue 24th February 2026 at 3:00PM

Location: E0.32 (beside Pi restaurant)

Abstract: In my presentation, I introduce two principles that I believe are essential for understanding systematic properties—such as financial “systemic risk”—in sequences of mathematical objects (for example, random variables).

First, I assume that a systematic property is invariant to scale: economies of scale may reduce idiosyncratic noise, but they cannot remove systemic risk. Second, I assume invariance to finite perturbations: removing (or modifying) any finite part of a portfolio cannot eliminate its systematic component. Mathematically, this means that no finite alteration of a sequence can change the underlying systemic property we aim to study.

Together, these assumptions lead to notions of systematic equivalence and compatibility across (infinite) arrays within a sequence (e.g., arrays of risk variables inside an insurance portfolio). The key consequence is a rigorous decomposition: the object of interest associated with an array (for instance, risk in the pricing space) splits into systematic and unsystematic parts. An analogous decomposition can be obtained through the bi-dual embedding (i.e., in the risk space itself). This separation clarifies

what is truly structural versus what becomes relevant mainly because we work with finite samples.

A central aim of the paper is to show how these ideas translate into practice for risk management—especially for risk measurement.

Finally, the same framework offers a fresh lens on the Turkey heuristic, recently discussed in the philosophy of risk by Nassim Nicholas Taleb and Gerd Gigerenzer as a critique of Bayesian updating approaches to risk. The comments include a link to the full paper and a recording of my short presentation at the Fields Institute

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