PANTHÉON-ASSAS UNIVERSITÉ PARIS

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LEMMA
Laboratoire d'économie mathématique et de microéconomie appliquée

SÉMINAIRE

VAR-CONSTRAINED CHOQUET-WASSERSTEIN P-BOX APPROXIMATION FOR ROBUST STOP-LOSS REINSURANCE SELECTION

12 December 2025
Salle Maurice Desplas
4 rue Blaise Desgoffes 75006 Paris

The next LEMMA seminar will host Davide Perutti from Sapienza University.

Guillaume will present "VaR-constrained Choquet-Wasserstein p-box approximation for robust stop-loss reinsurance selection"

Abstract : We consider a robust version of the optimal retention selection in a stop-loss reinsurance contract under ambiguity. Taking Dempster-Shafer theory as the reference uncertainty calculus, it is known that probability distortions can show the so-called dilation phenomenon. This last fact particularly affects robust quantile-type risk measures and may produce overestimations of capital requirements. For this reason, we face the approximation of an arbitrary belief function in Dempster-Shafer theory, seen as the imprecise distribution of a random loss, with a suitable pair of lower-upper cumulative distribution functions (also called a p-box). The quoted p-box is asked to minimize a Choquet-Wasserstein pseudo-distance while satisfying inequality constraints on the corresponding lower-upper quantile functions. We show that the computation of the approximating p-box can be carried out efficiently through a generalization of the Dykstra's algorithm by relying on a proper entropic formulation. We apply the described approximation to the initial reinsurance problem, which is formulated via the minimization

of the pessimistic VaR of the pessimistic total loss of the insurer. We derive a characterization of the robust optimal retention level and envisage related hierarchical games under ambiguity between the reinsurer and the insurer.