

## Seminário

Grupo de Probabilidades e Estatística

17 de junho de 2026

14:00

Sala Sousa Pinto

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### Entropy-Based Methods for Cross-Level Inference and Spatial Microsimulation

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#### Abstract

A frequent problem in inverse modelling and statistical reconstruction is the recovery of fine-scale probability distributions from data observed only at aggregated levels. In this talk, I present an entropy-based framework for cross-level inference, formulated as a constrained optimisation problem in which the objective is the minimisation of a Kullback–Leibler divergence subject to a system of cross-moment constraints. The resulting estimator —Generalised Cross-Entropy (GCE)— admits a dual Lagrangian formulation that facilitates computation and provides insight into existence, uniqueness, and convergence properties. I will discuss the role of support vectors, prior specification, and the structure of the associated fixed-point iterations. Two empirical applications illustrate the method: the estimation of liquid-asset poverty rates and the reconstruction of regional wealth distributions for 88 European NUTS2/NUTS1 regions, obtained exclusively through entropy-based disaggregation in the absence of direct regional data. The methodology is implemented in the R package *EIEntropy*.

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