

Titre : "Operator Learning for recommender systems and uncertainty quantification"

Résumé :

We will present the work done under the supervision of Karim Lounici where we studied the estimation of various operators. We will first talk about covariance estimation in the presence of outliers and prove that a simple estimator is minimax optimal and outperforms complex state of the art procedures. We then look at multi-task linear bandits, where we assume that the transfer matrix can be decomposed into two factors: a representation matrix shared by all task and a idiosyncratic matrix specific to each task. This decomposition allows for efficient meta-learning, where any new task sharing the same decomposition will only require the learning of the idiosyncratic factor. In a third part we look at non-linear transfer operators, for which we introduce a novel procedure using deep-learning to learn the conditional expectation operator. This procedure allows for simple architectures to equal or out perform more complex architectures such as normalising flows. Furthermore, our estimator has theoretical garanties on its precision. It also provides confidence intervals without requiring additional training.