

Workshop “New Trends in Quantum Control” (<https://team.inria.fr/mctao/workshop-new-trends-in-quantum-control/>) 📍

Stage M2 (2024-25) : Optimal control for the design of an experiment in neuroscience

– Looking for applicants –

Context and goals:

Experimental design focuses on optimizing data acquisition and utilization to minimize computational and experimental burden. For parameter identification in model-based input-output systems, a common approach involves optimizing the Fisher information matrix to reduce uncertainty stemming from the stochastic nature of experiments. When the input-output model is rooted in a dynamical system, this can be recast as an optimal control problem. The focus of this internship is to explore the contribution of geometric control theory to experimental design, particularly by refining existing work and defining new foundational examples that will guide algorithm development.

The project is motivated by a problem from neuroscience. Experimental setups have been developed to investigate retinal response in healthy and pathological situations in order to develop innovative diagnostic methodologies. Before the data can be fully utilized, a model-tuning process is necessary to determine the appropriate stimuli for each unique retina. However, working with the retina means that any time spent on parameter tuning results in a significant loss of valuable resources. The application of solutions developed during the internship, in collaboration with the Biovision Lab at Inria, will be a driving factor and guide the fundamental questions we will pursue.

If the intern shows potential, the internship can lead to a PhD grant application.

Work environment:

For Master 2 students. The internship will take place in 2025 in Université Côte d’Azur and Inria, within the nonlinear control team MCTAO, and last 4 to 6 months.

References:

- Sager, S. (2013). Sampling decisions in optimum experimental design in the light of Pontryagin’s maximum principle. *SIAM Journal on Control and Optimization*, 51(4), 3181-3207.
- Pronzato, L. (2008). Optimal experimental design and some related control problems. *Automatica*, 44(2), 303-325.
- Souihel, S., & Cessac, B. (2021). On the potential role of lateral connectivity in retinal anticipation. *The Journal of Mathematical Neuroscience*, 11, 1-60.

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