Postdoc position on optimal control theory with applications to epidemiology

MISTEA research unit – Montpellier, France

24 months - 2024-2026

In the scope of the NOCIME project (New Observation and Control Issues Motivated by Epidemiology) funded by the French National Research Agency (ANR), we are offering a 2-year position for a young PhD. The aim is to study various optimal control problems with unconventional criteria, and apply them to epidemiological models in continuous time, in relatively short dimension. By unconventional, we mean criteria that are not of the usual Lagrange, Mayer or Bolza form, such as crisis time, peak minimization, or maximization of the epidemic final size. The work will be both theoretical, in line with previous contributions, and numerical. In particular, we will study reformulations and/or approximations of these problems in a more classical form by extending the state vector in order to benefit from existing numerical methods (direct, HJB, shooting methods...). For the applications, particular emphasis will be placed on the study of optimal control laws, especially in the form of state feedback. Guaranteed sub-optimality may be an alternative approach for problems where optimal state feedback is too difficult to characterize analytically. The coupling of control laws with state observers to be developed in the project could be studied in the second year of the postdoc.

The position is for 24 months to be started between 1st January and 31th December 2024, based in Montpellier (MISTEA unit, Campus de La Gaillarde) in interaction with two senior researchers (Alain Rapaport and Patrice Loisel), with frequent exchanges with the other project partners: INRIA Paris, Lille, Metz and IRD/Paris Sorbonne. The expected profile is a young PhD with a good knowledge of optimal control theory, motivated by both theoretical and numerical implementation aspects. Applications from young female researchers are just as eagerly awaited as those from young male researchers.

For more information, contact (with a cv) Alain Rapaport (`alain.rapaport@inrae.fr`) and Pierre-Alexandre Bliman (`pierre-alexandre.bliman@inria.fr`).

References

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