Research Internship
On-Line Parameter Estimation in Bioreactors

Topic profile

theory/math

coding

wet-lab

Tags

#bioengineering

#wetlab

#digital twins

Supervision

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We are looking for

We are looking for a Masters student in Bioengineering or a related field with a strong interest in data analysis and coding. Previous experience with microbial culture, cell handling and the use of plate readers and photometry techniques is highly valued. Experience with Python is required.

The team

You will be part of an interdisciplinary research team at Laboratoire Méthodes Formelles in the ENS Paris-Saclay, near Paris, working at the interface between AI and bioengineering.

Research

From biofuels to pharmaceuticals, bioreactors enable the optimization of industrial and biomedical product manufacturing. Achieving this requires accurately understanding, modeling, and tracking the evolution of biological processes over time.
During this internship, the student will focus on two complementary aspects. The first is an experimental component, primarily involving the construction of microbial growth curves through optical density measurements using photometric/nanophotometric techniques. The second is a data analysis and coding component, centered on validating state estimation techniques from the literature by using the acquired data.

You are interested or would like to join us?

Please mail your questions or, in case you would like to apply, a short statement of interest and a CV to Benedikt Bollig (bollig@lmf.cnrs.fr), Matthias Függer (mfuegger@lmf.cnrs.fr), and Thomas Nowak (thomas@thomas-nowak.net).

Literature

[1] Krce et al. A simple interaction-based E. coli growth model. *NIPS'17*, 2019. URL

[2] G. Bastin and D. Doc, On-line Estimation and Adaptive Control of Bioreactors, 1990. URL

[3] Denis Dochain, State and parameter estimation in chemical and biochemical processes: a tutorial, 2002. URL

[4] Kim et al. A Review of Dynamic Modeling Approaches and Their Application in Computational Strain Optimization for Metabolic Engineering. J. Mach. Learn. Res., 22:75:175:35, 2021. URL