Minimization of tumor size: optimal parameter selection

Minimize the size of a tumor by optimizing the drug dosage and administration times.

Given a mathematical model that describes the evolution of the size of a tumor, the problem of shrinking the tumor size can be transformed into a mathematical constrained optimization problem [1]. The cost function is the size of the tumor at a future time and the parameters under optimization are the drug dosage and administration times. The constraints of the problem are the maximum dosage that the organism can handle.

Finding an optimal set of parameters can be a step towards creating more efficient and safe protocols.

The goal of this project is to formulate and solve the optimization problem. The student will learn modern techniques in optimization and will get insight into pharmacokinetics modelling.

This project is suitable for both Bachelor and Master Thesis.


PREREQUISITES
• Knowledge of C or Python
• Work Independently
• Enjoy critical thinking

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In the CSE Lab, we combine computational methods, computer science tools and domain specific knowledge to solve scientific and engineering problems in areas such as Fluid Mechanics, Nanotechnology and Life Sciences. The core computational competences of our group are in particle methods and in stochastic optimization techniques. Motivated by challenges in application fields, we focus on identifying the common elements among computational techniques and on formulating common methodological, algorithmic and software structures that facilitate their further development.