

数学与系统科学研究院

计算数学所学术报告

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报告题目:

**Dynamic flux balance analysis and
its application to simulate
bioreactors**

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报告时间: 2017 年 8 月 30 日 (周三)

下午 15:00-16:00

报告地点: 科技综合楼楼三层

311 报告厅

Abstract:

Dynamic flux balance analysis (DFBA) extends flux balance analysis and enables the combined simulation of both intracellular and extracellular environments of microbial cultivation processes. A DFBA model contains two coupled parts, a differential part at the upper level (extracellular environment) and an optimization part at the lower level (intracellular environment). Both parts are coupled through substrate uptake and product secretion rates. To solve DFBA model, theoretical solution of optimization-constrained differential equations (OCDE) is analyzed first. By utilizing KKT conditions, sufficient conditions are given so that the local solutions of OCDE correspond to the local solutions of a sequence of index-1 differential algebraic equations. A numerical solution algorithm is proposed to solve OCDE, which is further adapted to regularize the lower-level optimization problem of DFBA models. The developed approach is applied to several illustrating metabolic networks and the central network of wild-type *Corynebacterium glutanmicum*.

欢迎大家参加！