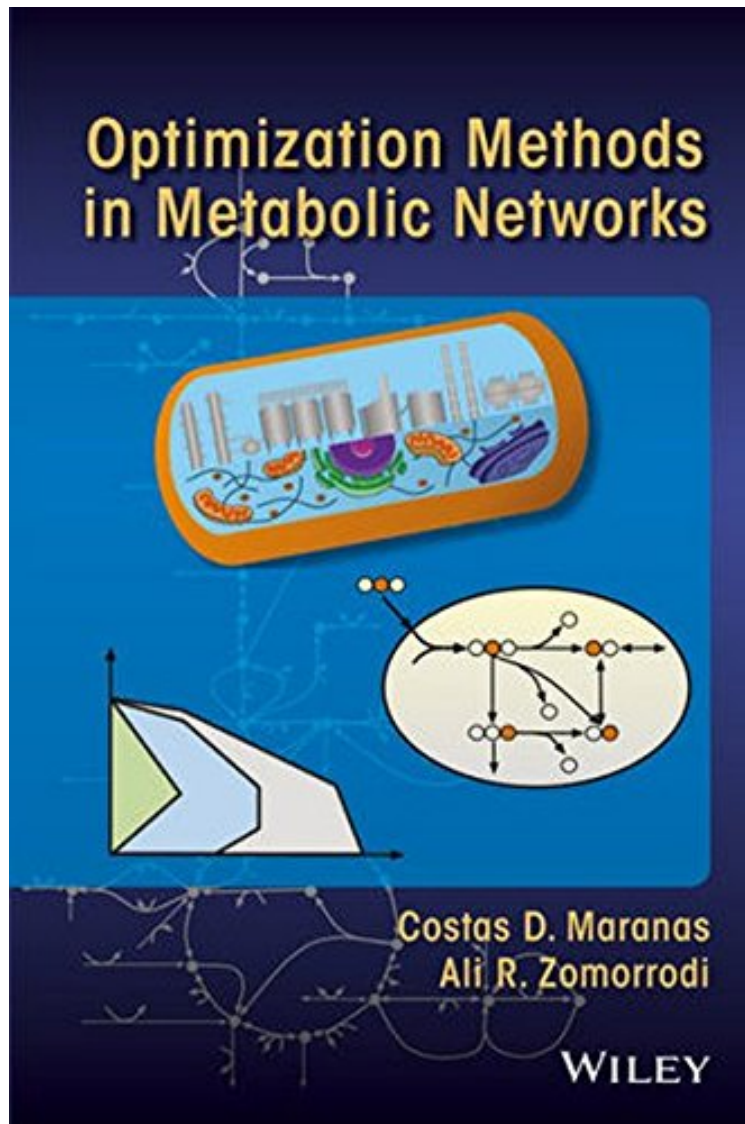


# Optimization Methods in Metabolic Networks

*Costas D. Maranas, Ali R. Zomorodi*  
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#2304102 in Books 2016-02-23 Original language: English PDF # 1 9.50 x .90 x 6.401, .0 #File Name: 1119028493288 pages | File size: 67.Mb

**Costas D. Maranas, Ali R. Zomorodi : Optimization Methods in Metabolic Networks** before purchasing it in order to gage whether or not it would be worth my time, and all praised Optimization Methods in Metabolic Networks:

1 of 1 people found the following review helpful. Comprehensive and easy-to-read introduction to the field of metabolic network modeling and optimization By Stefke This book gives a comprehensive overview of optimization techniques for analyzing and engineering metabolic reaction networks. The authors, two leading experts in the field, describe how metabolic networks can be modeled and then analyzed via different classes of optimization

problems (LP, MILP, NLP and MINLP). As a particular strength, the respective mathematical fundamentals of each of these four problem classes are reviewed in separate chapters before they are used in the context of metabolic networks. These introductions are very helpful and bring the reader up to the level needed for the application-oriented chapters. Due to the large diversity of approaches developed in this field, it is virtually impossible to present all relevant methods but the book definitely covers central concepts and major techniques of metabolic network analysis and computational strain design. The examples and exercises are very helpful to illustrate and practice the theory. Overall, the book can be highly recommended as an introduction for students / beginners in biotechnology, computational biology, systems biology, metabolic engineering and related fields but it also provides a valuable reference for more experienced users.

Provides a tutorial on the computational tools that use mathematical optimization concepts and representations for the curation, analysis and redesign of metabolic networks Organizes, for the first time, the fundamentals of mathematical optimization in the context of metabolic network analysis Reviews the fundamentals of different classes of optimization problems including LP, MILP, MLP and MINLP Explains the most efficient ways of formulating a biological problem using mathematical optimization Reviews a variety of relevant problems in metabolic network curation, analysis and redesign with an emphasis on details of optimization formulations Provides a detailed treatment of bilevel optimization techniques for computational strain design and other relevant problems

From the Back Cover Provides a tutorial on the computational tools that use mathematical optimization concepts and representations for the curation, analysis and redesign of metabolic networks Analysis and redesign of metabolic networks often requires the calculation of product yield, gene essentiality prediction, identification of network gaps in the model, resolution of discrepancies with experimental data and identification of network modifications that increase product yield. The main goal of *Optimization Methods in Metabolic Networks* is to apply the language and tools of mathematical programming to describe and solve such frequently occurring tasks. Topics covered in this book start with a formal treatment of the relevant optimization problem class followed by relevant metabolic network applications. The class of optimization problems becomes progressively more complex, starting with linear programming (LP) and mixed-integer linear programming (MILP) problems and concluding with nonlinear programming (NLP) and mixed-integer nonlinear programming (MINLP) problems. *Optimization Methods in Metabolic Networks*: Organizes, for the first time, the fundamentals of mathematical optimization in the context of metabolic network analysis s the foundational principles of different classes of optimization problems including LP, MILP, NLP and MINLP Explains how to formulate a metabolic network analysis or redesign task using mathematical optimization s a variety of problems in metabolic network curation, analysis and redesign with an emphasis on the details of the optimization formulations Provides a detailed treatment of bilevel optimization techniques for computational strain design and other relevant applications Provides input files for examples presented on an accompanying website Includes problems and exercises for helping to reinforce the introduced concepts *Optimization Methods in Metabolic Networks* can be used to introduce students with the knowledge of metabolism to formal mathematical treatments of core computational tasks in metabolic networks or alternatively expose students with a mathematical programming background to metabolism. The hope is that this book will serve as a starting point for more in-depth investigations of relevant techniques and concepts found in the cited literature. Costas D. Maranas is a Donald B. Broughton Professor in the Department of Chemical Engineering at Pennsylvania State University, USA. Dr. Maranas is a Fellow of the American Institute of Medical and Biological Engineering (AIMBE). In 2002 he was awarded by AIChE the Allan P. Colburn Award for Excellence in Publications by a Young Member of the Institute. Ali R. Zomorodi obtained his PhD in Chemical Engineering at Pennsylvania State University and is currently a Postdoctoral Research Associate at Boston University, USA. Dr. Zomorodi's areas of expertise include optimization-based modeling and model-driven analysis of biological networks.