



*processes*



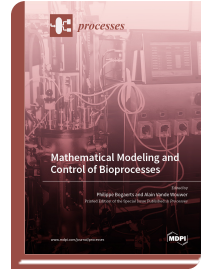
*Special Issue Reprint*

## **Mathematical Modeling and Control of Bioprocesses**

[www.mdpi.com/books/reprint/7209](http://www.mdpi.com/books/reprint/7209)

Edited by  
Philippe Bogaerts  
Alain Vande Wouwer

ISBN 978-3-0365-7140-9 (Hardback)  
ISBN 978-3-0365-7141-6 (PDF)



Mathematical modeling is at the heart of most current developments in biological system analysis and bioprocess optimization and control. At the industrial scale, this evolution is reflected in process analytical technologies (PAT), digital twins, and Industry 4.0. This reprint focuses on various aspects of mathematical modeling at the microscopic and macroscopic scales, respectively, and demonstrates the potential of these methodologies to gain insight into the cell metabolism, to support the design of software sensors to reconstruct unmeasurable variables, or to establish model-based optimization of the operating conditions and/or feedback control of the bioprocesses. The range of applications is vast, including biopharmaceuticals, bioenergy, and the environment.



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