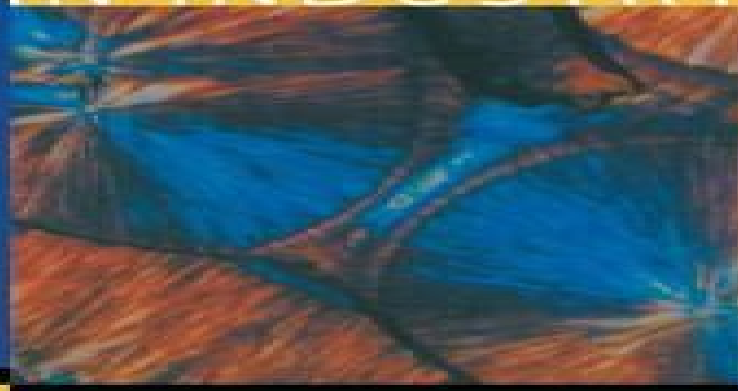# MATHEMATICS IN INDUSTRY 2

Vincenzo Capasso
Editor

Mathematical Modelling for Polymer Processing

Polymerization,
Crystallization,
Manufacturing

Springer

E C M I

Mathematical Modelling For Polymer Procebing Polymerization Crystallization Manufacturing

P. Causin,G. Guidoboni,R. Sacco,A. Harris

Mathematical Modelling For Polymer Procebing Polymerization Crystallization Manufacturing:

Mathematical Modelling for Polymer Processing Vincenzo Capasso,2003 A large amount of relevant mathematical problems arise from the polymer industry with respect to the quality of manufactured polymer parts This book provides the first unified presentation of the mathematical modeling of polymerization crystallization and extrusion of polymer melts by means of advanced methods presented in an accessible way for applied scientists and engineers *Mathematical Modelling for Polymer Processing* Vincenzo Capasso,2012-12-06 Polymers are substances made of macromolecules formed by thousands of atoms organized in one homopolymers or more copolymers groups that repeat themselves to form linear or branched chains or lattice structures The concept of polymer traces back to the years 1920 s and is one of the most significant ideas of last century It has given great impulse to indus try but also to fundamental research including life sciences Macromolecules are made of sm all molecules known as monomers The process that brings monomers into polymers is known as polymerization A fundamental contri bution to the industrial production of polymers particularly polypropylene and polyethylene is due to the Nobel prize winners Giulio Natta and Karl Ziegler The ideas of Ziegler and Natta date back to 1954 and the process has been improved continuously over the years particularly concerning the design and shaping of the catalysts Chapter 1 due to A Fasano is devoted to a review of some results concerning the modelling of the Ziegler Natta polymerization The specific ex am pie is the production of polypropilene The process is extremely complex and all studies with relevant mathematical contents are fairly recent and several problems are still open **Modeling, Simulation and Optimization of Complex Processes** Hans Georg Bock,Ekaterina Kostina,Xuan Phu Hoang,Rolf Rannacher,2008-06-19 This proceedings volume covers the broad interdisciplinary spectrum of scientific computing and presents recent advances in theory development of methods and applications in practice **Free Boundary Problems** Pierluigi Colli,Claudio Verdi,Augusto Visintin,2012-12-06 Many phenomena of interest for applications are represented by differential equations which are defined in a domain whose boundary is a priori unknown and is accordingly named a free boundary A further quantitative condition is then provided in order to exclude indeterminacy Free boundary problems thus encompass a broad spectrum which is represented in this state of the art volume by a variety of contributions of researchers in mathematics and applied fields like physics biology and material sciences Special emphasis has been reserved for mathematical modelling and for the formulation of new problems **Progress in Industrial Mathematics at ECMI 2006** Luis L. Bonilla,Miguel Moscoso,Gloria Platero,Jose M. Vega,2007-12-24 Proceedings from the 14th European Conference for Mathematics in Industry held in Madrid present innovative numerical and mathematical techniques Topics include the latest applications in aerospace information and communications materials energy and environment imaging biology and biotechnology life sciences and finance In addition the conference also delved into education in industrial mathematics and web learning **Industry days 2003-2004** ,2005 **Topics in Spatial Stochastic Processes** Vincenzo Capasso,2003-01-21 The

theory of stochastic processes indexed by a partially ordered set has been the subject of much research over the past twenty years The objective of this CIME International Summer School was to bring to a large audience of young probabilists the general theory of spatial processes including the theory of set indexed martingales and to present the different branches of applications of this theory including stochastic geometry spatial statistics empirical processes spatial estimators and survival analysis This theory has a broad variety of applications in environmental sciences social sciences structure of material and image analysis In this volume the reader will find different approaches which foster the development of tools to modelling the spatial aspects of stochastic problems **Mathematical Modelling for Polymer Processing** Vincenzo Capasso,2011-05-08 **Selected Topics in Cancer Modeling** Nicola Bellomo,Elena de Angelis,2008-12-10 This collection of selected chapters offers a comprehensive overview of state of the art mathematical methods and tools for modeling and analyzing cancer phenomena Topics covered include stochastic evolutionary models of cancer initiation and progression tumor cords and their response to anticancer agents and immune competition in tumor progression and prevention The complexity of modeling living matter requires the development of new mathematical methods and ideas This volume written by first rate researchers in the field of mathematical biology is one of the first steps in that direction **Integrated Multidisciplinary Approaches in the Study and Care of the Human Eye** P. Causin,G. Guidoboni,R. Sacco,A. Harris,2014-12-17 ForewordThe human eye offers the extraordinary possibility to visualize and monitor non invasively in vivo in humans many morphological and haemodynamical features Therefore a large amount of data on ocular structures and macro and micro circulation can be obtained in a clinical setting during a patient s visit However the interpretation of these data remains a very challenging task since the understanding of the physiology bio mechanics and fluid dynamics of the human eye remains scarce This unmet gap between the availability of imaging data and their elusive clinical interpretatio

Math Everywhere G. Aletti,Martin Burger,Alessandra Micheletti,Daniela Morale,2007-07-11 These proceedings report on the conference Math Everywhere celebrating the 60th birthday of the mathematician Vincenzo Capasso The conference promoted ideas Capasso has pursued and shared the open atmosphere he is known for Topic sections include Deterministic and Stochastic Systems Mathematical Problems in Biology Medicine and Ecology Mathematical Problems in Industry and Economics The broad spectrum of contributions to this volume demonstrates the truth of its title Math is Everywhere indeed

Mathematical Reviews ,2003 **Progress in Industrial Mathematics at ECMI 2012** Magnus Fontes,Michael Günther,Nicole Marheineke,2014-05-14 This book contains the proceedings of the 17th European Conference on Mathematics for Industry ECMI2012 held in Lund Sweden July 2012 at which ECMI celebrated its 25th anniversary It covers mathematics in a wide range of applications and methods from circuit and electromagnetic devices environment fibers flow medicine robotics and automotive industry further applications to methods and education The book includes contributions from leading figures in business science and academia that promote the application of mathematics to industry and

emphasize industrial sectors that offer the most exciting opportunities The contributions reinforce the role of mathematics as being a catalyst for innovation as well as an overarching resource for industry and business The book features an accessible presentation of real world problems in industry and finance provides insight and tools for engineers and scientists who will help them to solve similar problems and offers modeling and simulation techniques that will provide mathematicians with a source of fresh ideas and inspiration *Advances and Developments, 1994-2005* Elias A. Lipitakis,2006 **HERCMA 2001** ,2002 **Monitoring Polymerization Reactions** Wayne F. Reed,Alina M. Alb,2013-12-02 Offers new strategies to optimize polymer reactions With contributions from leading macromolecular scientists and engineers this book provides a practical guide to polymerization monitoring It enables laboratory researchers to optimize polymer reactions by providing them with a better understanding of the underlying reaction kinetics and mechanisms Moreover it opens the door to improved industrial scale reactions including enhanced product quality and reduced harmful emissions Monitoring Polymerization Reactions begins with a review of the basic elements of polymer reactions and their kinetics including an overview of stimuli responsive polymers Next it explains why certain polymer and reaction characteristics need to be monitored The book then explores a variety of practical topics including Principles and applications of important polymer characterization tools such as light scattering gel permeation chromatography calorimetry rheology and spectroscopy Automatic continuous online monitoring of polymerization ACOMP reactions a flexible platform that enables characterization tools to be employed simultaneously during reactions in order to obtain a complete record of multiple reaction features Modeling of polymerization reactions and numerical approaches Applications that optimize the manufacture of industrially important polymers Throughout the book the authors provide step by step strategies for implementation In addition ample use of case studies helps readers understand the benefits of various monitoring strategies and approaches enabling them to choose the best one to match their needs As new stimuli responsive and intelligent polymers continue to be developed the ability to monitor reactions will become increasingly important With this book as their guide polymer scientists and engineers can take full advantage of the latest monitoring strategies to optimize reactions in both the lab and the manufacturing plant **Modeling and Simulation in Polymer Reaction Engineering** Klaus-Dieter Hungenberg,Michael Wulkow,2018-05-29 Introducing a unique modular approach to modeling polymerization reactions this useful book will enable practitioners chemists and engineers alike to set up and structure their own models for simulation software like Predici C MatLab or others The generic modules are exemplified for concrete situations for various reactor types and reaction mechanisms and allow readers to quickly find their own point of interest a highly useful information source for polymer engineers and researchers in industry and academia *American Book Publishing Record* ,2003 *University of Michigan Official Publication* University of Michigan,1999 Each number is the catalogue of a specific school or college of the University *Textile Technology Digest* ,2002

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