1.	Record Nr.	UNINA9910254308503321
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	Titolo	Mathematical Modeling / / by Christof Eck, Harald Garcke, Peter Knabner
	Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2017
	ISBN	3-319-55161-2
	Edizione	[1st ed. 2017.]
	Descrizione fisica	1 online resource (XV, 509 p. 107 illus., 2 illus. in color.)
	Collana	Springer Undergraduate Mathematics Series, , 1615-2085
	Disciplina	003.3
	Soggetti	Mathematical models Mathematical Modeling and Industrial Mathematics
	Lingua di pubblicazione	Inglese
	Formato	Materiale a stampa
	Livello bibliografico	Monografia
	Nota di bibliografia	Includes bibliographical references and index.
	Nota di contenuto	1Introduction -- 2 Systems of Linear Equations -- 3 Basic Principles of Thermodynamics -- 4 Ordinary Differential Equations -- 5 Continuum Mechanics -- 6 Partial Differential Equations -- 7 Free Boundary Problems.-.
	Sommario/riassunto	Mathematical models are the decisive tool to explain and predict phenomena in the natural and engineering sciences. With this book readers will learn to derive mathematical models which help to understand real world phenomena. At the same time a wealth of important examples for the abstract concepts treated in the curriculum of mathematics degrees are given. An essential feature of this book is that mathematical structures are used as an ordering principle and not the fields of application. Methods from linear algebra, analysis and the theory of ordinary and partial differential equations are thoroughly introduced and applied in the modeling process. Examples of applications in the fields electrical networks, chemical reaction dynamics, population dynamics, fluid dynamics, elasticity theory and crystal growth are treated comprehensively.