1. Record Nr. UNINA9910366578603321

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Titolo	Advanced Thermal Stress Analysis of Smart Materials and Structures / / by Zengtao Chen, Abdolhamid Akbarzadeh
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2020
ISBN	3-030-25201-9
Edizione	[1st ed. 2020.]
Descrizione fisica	1 online resource (X, 304 p. 104 illus., 44 illus. in color.)
Collana	Structural Integrity, , 2522-560X ; ; 10
Disciplina	531 620.11296
Soggetti	Mechanics Mechanics, Applied Materials science Mathematical models Solid Mechanics Characterization and Evaluation of Materials Mathematical Modeling and Industrial Mathematics
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Heat conduction and moisture diffusion theories -- Basic Problems of Non-Fourier Heat Conduction -- Multiphysics of smart materials and structures -- Coupled thermal stresses in advanced and smart materials -- Thermal Fracture of Advanced Materials based on Fourier Heat Conduction -- Advanced thermal fracture analysis based on non-Fourier heat conduction models -- Future Perspectives.
Sommario/riassunto	This is the first single volume monograph that systematically summarizes the recent progress in using non-Fourier heat conduction theories to deal with the multiphysical behaviour of smart materials and structures. The book contains six chapters and starts with a brief introduction to Fourier and non-Fourier heat conduction theories. Non-Fourier heat conduction theories include Cattaneo-Vernotte, dual-phase-lag (DPL), three-phase-lag (TPL), fractional phase-lag, and nonlocal phase-lag heat theories. Then, the fundamentals of thermal wave characteristics are introduced through reviewing the methods for

solving non-Fourier heat conduction theories and by presenting transient heat transport in representative homogeneous and advanced heterogeneous materials. The book provides the fundamentals of smart materials and structures, including the background, application, and governing equations. In particular, functionally-graded smart structures made of piezoelectric, piezomagnetic, and magnetoelectroelastic materials are introduced as they represent the recent development in the industry. A series of uncoupled thermal stress analyses on one-dimensional structures are also included. The volume ends with coupled thermal stress analyses of one-dimensional homogenous and heterogeneous smart piezoelectric structures considering different coupled thermopiezoelectric theories. Last but not least, fracture behavior of smart structures under thermal disturbance is investigated and the authors propose directions for future research on the topic of multiphysical analysis of smart materials. .