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Titolo	Direct Methods for Limit and Shakedown Analysis of Structures [[electronic resource]] : Advanced Computational Algorithms and Material Modelling / / edited by Paolo Fuschi, Aurora Angela Pisano, Dieter Weichert
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ISBN	3-319-12928-7
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Descrizione fisica	1 online resource (315 p.)
Collana	Solid Mechanics and Its Applications, , 0925-0042 ; ; 220
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Soggetti	Mechanics Mechanics, Applied Structural materials Computer mathematics Civil engineering Theoretical and Applied Mechanics Structural Materials Computational Science and Engineering Civil Engineering
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Description based upon print version of record.
Nota di bibliografia	Includes bibliographical references.
Nota di contenuto	A stress-based variational model for ductile porous materials and its extension accounting for Lode angle effects -- Limit Analysis and macroscopic strength of porous materials with Coulomb matrix -- A direct method formulation for topology plastic design of continua -- The influence of limited kinematical hardening on shakedown of materials and structures -- Theoretical Basis and a Finite Element Formula for the Direct Calculation of Steady Plastic States -- On the statistical determination of yield strength, ultimate strength, and endurance limit of a particle reinforced metal matrix composite (PRMMC) -- A new starting point strategy for shakedown analysis -- Yield design of periodically heterogeneous plates -- RSDM-S: A Method

for the Evaluation of the Shakedown Load of Elastoplastic Structures -- An efficient algorithm for shakedown analysis based on equality constrained sequential quadratic programming -- Limit analysis on RC-structures by a multi-yield-criteria numerical approach -- Shakedown analysis within the framework of strain gradient plasticity -- Shakedown analysis of 3D frames with an effective treatment of the load combinations -- Uncertain Multimode Failure and Shakedown Analysis of Shells -- Three-dimensional shakedown solutions for cross-anisotropic cohesive-frictional materials under moving loads.

Sommario/riassunto

Articles in this book examine various materials and how to determine directly the limit state of a structure, in the sense of limit analysis and shakedown analysis. Apart from classical applications in mechanical and civil engineering contexts, the book reports on the emerging field of material design beyond the elastic limit, which has further industrial design and technological applications. Readers will discover that “Direct Methods” and the techniques presented here can in fact be used to numerically estimate the strength of structured materials such as composites or nano-materials, which represent fruitful fields of future applications. Leading researchers outline the latest computational tools and optimization techniques and explore the possibility of obtaining information on the limit state of a structure whose post-elastic loading path and constitutive behavior are not well defined or well known. Readers will discover how Direct Methods allow rapid and direct access to requested information in mathematically constructive manners without cumbersome step-by-step computation. Both researchers already interested or involved in the field and practical engineers who want to have a panorama of modern methods for structural safety assessment will find this book valuable. It provides the reader with the latest developments and a significant amount of references on the topic. .