

1. Record Nr.	UNINA9910139612203321
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Titolo	Beam structures [[electronic resource] ] : classical and advanced theories / / Erasmo Carrera, Gaetano Giunta, Marco Petrolo
Pubbl/distr/stampa	Hoboken, N.J., : Wiley, 2011
ISBN	1-283-20455-X 9786613204554 1-119-95104-6 1-119-97856-4 1-119-97857-2
Edizione	[1st ed.]
Descrizione fisica	1 online resource (204 p.)
Classificazione	SCI041000
Altri autori (Persone)	GiuntaGaetano PetroloMarco
Disciplina	624.1/7723
Soggetti	Girders
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 and index.
Nota di contenuto	Beam Structures; Contents; About the Authors; Preface; Introduction; References; 1 Fundamental equations of continuous deformable bodies; 1.1 Displacement, strain, and stresses; 1.2 Equilibrium equations in terms of stress components and boundary conditions; 1.3 Strain displacement relations; 1.4 Constitutive relations: Hooke's law; 1.5 Displacement approach via principle of virtual displacements; References; 2 The Euler-Bernoulli and Timoshenko theories; 2.1 The Euler-Bernoulli model; 2.1.1 Displacement field; 2.1.2 Strains; 2.1.3 Stresses and stress resultants; 2.1.4 Elastica; 2.2 The Timoshenko model 2.2.1 Displacement field; 2.2.2 Strains; 2.2.3 Stresses and stress resultants; 2.2.4 Elastica; 2.3 Bending of a cantilever beam: EBBT and TBT solutions; 2.3.1 EBBT solution; 2.3.2 TBT solution; References; 3 A refined beam theory with in-plane stretching: the complete linear expansion case; 3.1 The CLEC displacement field; 3.2 The importance of linear stretching terms; 3.3 A finite element based on CLEC; Further reading; 4 EBBT, TBT, and CLEC in unified form; 4.1 Unified formulation of CLEC; 4.2 EBBT and TBT as particular cases of CLEC

4.3 Poisson locking and its correction 4.3.1 Kinematic considerations of strains; 4.3.2 Physical considerations of strains; 4.3.3 First remedy: use of higher-order kinematics; 4.3.4 Second remedy: modification of elastic coefficients; References; 5 Carrera Unified Formulation and refined beam theories; 5.1 Unified formulation; 5.2 Governing equations; 5.2.1 Strong form of the governing equations; 5.2.2 Weak form of the governing equations; References; Further reading; 6 The parabolic, cubic, quartic, and N-order beam theories; 6.1 The second-order beam model,  $N = 2$ ; 6.2 The third-order,  $N = 3$ , and the fourth-order,  $N = 4$ , beam models; 6.3 N-order beam models; Further reading; 7 CUF beam FE models: programming and implementation issue guidelines; 7.1 Preprocessing and input descriptions; 7.1.1 General FE inputs; 7.1.2 Specific CUF inputs; 7.2 FEM code; 7.2.1 Stiffness and mass matrix; 7.2.2 Stiffness and mass matrix numerical examples; 7.2.3 Constraints and reduced models; 7.2.4 Load vector; 7.3 Postprocessing; 7.3.1 Stresses and strains; References; 8 Shell capabilities of refined beam theories; 8.1 C-shaped cross-section and bending-torsional loading; 8.2 Thin-walled hollow cylinder 8.2.1 Static analysis: detection of local effects due to a point load; 8.2.2 Free-vibration analysis: detection of shell-like natural modes; 8.3 Static and free-vibration analyses of an airfoil-shaped beam; 8.4 Free vibrations of a bridge-like beam; References; 9 Linearized elastic stability; 9.1 Critical buckling load classic solution; 9.2 Higher-order CUF models; 9.2.1 Governing equations, fundamental nucleus; 9.2.2 Closed form analytical solution; 9.3 Examples; References; 10 Beams made of functionally graded materials; 10.1 Functionally graded materials; 10.2 Material gradation laws

## Sommario/riassunto

"Present a new, unified approach to both classical and advanced beam theory that is becoming established and recognised globally as the most important contribution to the field in the last quarter of a century. Beam Structures: Classical and Advanced Theories proposes a new original unified approach to beam theory that includes practically all classical and advanced models for beams and which has become established and recognised globally as the most important contribution to the field in the last quarter of a century. This approach overcomes the problem of classical formulae that require different formulas for tension, bending, shear and torsion; it can be applied to any beam geometries and loading conditions, reaching a high level of accuracy, and can tackle problems that in most cases are solved by employing plate/shell and 3D formulations. Beam Structures: Classical and Advanced Theories presents both the classical and advanced beam theories in a form that is very suitable for computer implementation. It is accompanied by dedicated software MUL2 that is used to obtain the numerical solutions in the book, allowing the reader to reproduce the examples given in the book as well as to solve other problems of their own. The authors also include a number of static and dynamic problems and solutions that serve to further illustrate the advanced theories presented"--

2. Record Nr.	UNINA9910484712803321
Titolo	IoT-based Intelligent Modelling for Environmental and Ecological Engineering : IoT Next Generation EcoAgro Systems // edited by Paul Krause, Fatos Xhafa
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Springer, , 2021
ISBN	3-030-71172-2
Edizione	[1st ed. 2021.]
Descrizione fisica	1 online resource (318 pages) : illustrations
Collana	Lecture Notes on Data Engineering and Communications Technologies, , 2367-4520 ; ; 67
Disciplina	577.0113
Soggetti	Engineering - Data processing Cooperating objects (Computer systems) Environment Computational intelligence Data Engineering Cyber-Physical Systems Environmental Sciences Computational Intelligence
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references.
Nota di contenuto	IoT-based Computational Modeling for Next Generation Agro-ecosystems: Research Issues, Emerging Trends and Challenges -- An IoT-Based Time Constrained Spectrum Trading in Wireless Communication for Tertiary Market -- 5G NB-IoT Enabled Smart Green Agriculture 4.0: A Survey -- Drones for Intelligent Agricultural Management -- Multi-Modal Sensor Nodes in Experimental Scalable Agricultural IoT Application Scenarios -- Design Architecture of Intelligent Agri-Infrastructure Incorporating IoT and Cloud: Link Budget and Socio-Economic Impact -- Remote Sensing and Soil Quality -- Enabling IoT Wireless Technologies in Sustainable Livestock Farming toward Agriculture 4.0.
Sommario/riassunto	This book brings to readers thirteen chapters with contributions to the benefits of using IoT and Cloud Computing to agro-ecosystems from a

multi-disciplinary perspective. IoT and Cloud systems have prompted the development of a Cloud digital ecosystem referred to as Cloud-to-thing continuum computing. The key success of IoT computing and the Cloud digital ecosystem is that IoT can be integrated seamlessly with the physical environment and therefore has the potential to leverage innovative services in agro-ecosystems. Areas such as ecological monitoring, agriculture, and biodiversity constitute a large area of potential application of IoT and Cloud technologies. In contrast to traditional agriculture systems that have employed aggressive policies to increase productivity, new agro-ecosystems aim to increase productivity but also achieve efficiency and competitiveness in modern sustainable agriculture and contribute, more broadly, to the green economy and sustainable food-chain industry. Fundamental research as well as concrete applications from various real-life scenarios, such as smart farming, precision agriculture, green agriculture, sustainable livestock and sow farming, climate threat, and societal and environmental impacts, is presented. Research issues and challenges are also discussed towards envisioning efficient and scalable solutions to agro-ecosystems based on IoT and Cloud technologies. Our fundamental belief is that we can collectively trigger a new revolution that will transition agriculture into an equable system that not only feeds the world, but also contributes to mitigating the climate change and biodiversity crises that our historical actions have triggered. .

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