1. Record Nr. UNINA9910955411203321

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Titolo	Bonded Joints and Repairs to Composite Airframe Structures
Pubbl/distr/stampa	Saint Louis, : Elsevier Science, 2015 London : , : Academic Press is an imprint of Elsevier, , [2016] ©2016
ISBN	9780124171725 0124171729 9780124171534 0124171532
Edizione	[1st ed.]
Descrizione fisica	1 online resource (0 p.)
Altri autori (Persone)	DuongCong N
Disciplina	620.118 629.13431
Soggetti	Fibrous composites Airframes - Design and construction
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	Preface ; Part 1. Analysis and design. Chapter 1. Introduction and overview ; 1.1. Aim of book ; 1.2. Criticality of structure and damage ; 1.3. Types of composite repairs and certification criteria ; 1.4. Overview of repair design and analysis process ; 1.5. Effect of load attraction in patch design ; 1.6. Effect of taper and scarf ratios on joint design ; 1.6.1. Safe-life approach ; 1.6.2. Damage tolerance approach ; 1.6.3. Stepped repairs ; 1.7. Summary ; References ; Chapter 2. Failure criteria ; 2.1. Introduction ; 2.2. Adhesive failure criteria ; 2.2.1. Failure criteria for brittle adhesives ; 2.2.2. Failure criteria for ductile adhesives ; 2.3. Composite failure criteria ; 2.3.1. Intralamina failure criteria ; 2.3.2. Interlaminar failure criteria ; 2.4. Summary ; References ; Chapter 3. Doubler joint analysis ; 3.1. Introduction ; 3.2. Untapered doublers and joints ; 3.2.1. Two-sided doublers and double strap joints ; 3.2.2. Elastic solution for adhesive peel and shear ; 3.3.3. Elastic-plastic solution for adhesive peel and shear ; 3.3.4. Effect of adherent shear deformation ; 3.3.5. Numerical examples ; 3.4. Summary ; References ; Chapter 4. Design of scarf and doubler-scarf joints ; 4.1. Introduction ;

4.2. Scarf joint of homogeneous adherends ; 4.2.1. Constant-angle scarf ; 4.2.2. Optimum angle of scarf between dissimilar materials 4.3. Composite scarf joints ; 4.3.1. Identical adherends with constant-angle scarf ; 4.3.2. Elasto-plastic stress analysis of scarf joints ; 4.4. Experiments and validation ; 4.4.1. Room temperature dry condition ; 4.4.2. Hot wet condition ; Doubler-scarf joints ; Conclusions ; References ; Chapter 5. Disbond and damage tolerance analysis of doubler repairs ; 5.1. Introduction ; 5.2. Analytical methods for delamination analysis ; 5.2.1. VCCT by FE method ; 5.2.2. Crack tip element approach ; 5.2.3. Cohesive zone model ; 5.3. Analytical methods for disbond analysis ; 5.4. Fatigue damage accumulation model for predicting interlaminar failure and disbond ; 5.5. Summary ; References ; Chapter 6. Damage tolerance and fatigue durability of scarf joints ; 6.1. Introduction ; 6.2. Impact damage of scarf joints and repairs ; 6.3. Effects of disbond on joint strength ; 6.4. Design methods ; 6.4.1. Average stress ; 6.4.2. Linear elastic fracture mechanics ; 6.4.3. Virtual crack closure technique (VCCT) ; 6.4.4. Cohesive zone model (CZM) ; 6.5. Verifications ; 6.5.1. Finite element model (FEM) ; 6.5.2. Strength prediction of scarf joints ; 6.6. Fatigue disbond growth life ; 6.6.1. Method ; 6.6.2. Experimental validation ; 6.6.3. Comparison between analysis and experiments ; 6.7. Discussion ; 6.8. Summary ; References ; Chapter 7. Design and analysis of doubler repairs ; 7.1. Introduction ; 7.2. Repair analysis for elliptical damages ; 7.2.1. Elastic solution for an elliptical hole in an anisotropic plate ; 7.2.2. Elastic solution for an elliptical inhomogeneity in a 2D anisotropic plate ; 7.2.3. Two-stage analysis procedure for determining load attraction and stress concentration ; 7.2.4. Strength assessment for an after repair damaged skin laminate ; 7.2.5. Bond line analysis by bonded joint or bonded doubler methods ; 7.3. Repair analysis for crack-line damages ; 7.3.1. Wang and Rose's crack bridging model ; 7.3.2. Two-stage analysis procedure for crack patching ; 7.4. Patch design for an elliptical damage ; 7.4.1. Design criteria and guidelines ; 7.4.2. Patch design algorithm 7.5. Summary ; References ; Chapter 8. Design and optimization of scarf repairs ; 8.1. Introduction ; 8.2. Residual strength of scarfed laminates ; 8.2.1. Tension and compression loading ; 8.2.2. Predictive modeling ; 8.3. Shape optimization of scarf repairs ; 8.3.1. Assessment of existing shaping methods 8.3.2. Optimum solution ; 8.3.3. Case studies ; 8.4. Structural doublers ; References -- Part 2. Manufacturing and inspection. Chapter 9. Repair manufacturing processes ; 9.1. Introduction ; 9.2. Scarfing operation ; 9.3. Repair patch manufacturing ; 9.3.1. Soft patch ; 9.3.2. Molded patch ; 9.4. Surface treatment ; 9.5. Adhesive bonding ; 9.6. Repair of thick laminates ; References ; Chapter 10. Non-destructive evaluation of bond ; 10.1. Introduction ; 10.2. Detection of disbonds ; 10.3. Detection of weak adhesion bonds ; 10.4. Local bond proof testing ; 10.5. Satellite coupon proof test ; References ; Index.

Sommario/riassunto

Covering analysis of both internal and external joints and repairs, as well as damage tolerance, non-destructive inspection and self-healing repairs, this book provides essential information on the joints and repairs themselves but, critically, on how they differ from bonds and repairs to metallic aircraft.

2. Record Nr. UNINA9910349322103321

Titolo	Current Trends in Mathematical Analysis and Its Interdisciplinary Applications / / edited by Hemen Dutta, Ljubiša D. R. Koinac, Hari M. Srivastava
Pubbl/distr/stampa	Cham : , : Springer International Publishing : , : Imprint : Birkhäuser, , 2019
ISBN	3-030-15242-1
Edizione	[1st ed. 2019.]
Descrizione fisica	1 online resource (912 pages)
Disciplina	515
Soggetti	Differential equations Integral equations Operator theory Functional analysis Special functions Differential Equations Integral Equations Operator Theory Functional Analysis Special Functions
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	FM -- Frictional Contact Problems for Steady Flow of Incompressible Fluids in Orlicz Spaces -- Discrete Fourier Transform and Theta Function Identities -- On Some Combinatorics of Rogers–Ramanujan Type Identities Using Signed Color Partitions -- Piecewise Continuous Stepanov-Like Almost Automorphic Functions with Applications to Impulsive Systems -- On the Convergence of Secant-Like Methods -- Spacetimes as Topological Spaces, and the Need to Take Methods of General Topology More Seriously -- Analysis of Generalized BBM Equations: Symmetry Groups and Conservation Laws -- Symmetry Analysis and Conservation Laws for Some Boussinesq Equations with Damping Terms -- On Some Variable Exponent Problems with No-Flux Boundary Condition -- On the General Decay for a System of

Viscoelastic Wave Equations -- Mathematical Theory of Incompressible Flows: Local Existence, Uniqueness, and Blow-Up of Solutions in Sobolev–Gevrey Spaces -- Mathematical Research for Models Which is Related to Chemotaxis System -- Optimal Control of Quasivariational Inequalities with Applications to Contact Mechanics -- On Generalized Derivative Sampling Series Expansion -- Voronoi Polygonal Hybrid Finite Elements and Their Applications -- VariationalMethods for Schrödinger Type Equations -- Nonlinear Nonhomogeneous Elliptic Problems -- Summability of Double Sequences and Double Series Over Non-Archimedean Fields: A Survey -- On Approximate Solutions of Linear and Nonlinear Singular Integral Equations -- On Approximate Solutions of Linear and Nonlinear Singular Integral Equations -- On Difference Double Sequences and Their Applications -- Pointwise Convergence Analysis for Nonlinear Double m-Singular Integral Operators -- A Survey on p-Adic Integrals -- On Statistical Deferred Cesàro Summability.

Sommario/riassunto

This book explores several important aspects of recent developments in the interdisciplinary applications of mathematical analysis (MA), and highlights how MA is now being employed in many areas of scientific research. Each of the 23 carefully reviewed chapters was written by experienced expert(s) in respective field, and will enrich readers' understanding of the respective research problems, providing them with sufficient background to understand the theories, methods and applications discussed. The book's main goal is to highlight the latest trends and advances, equipping interested readers to pursue further research of their own. Given its scope, the book will especially benefit graduate and PhD students, researchers in the applied sciences, educators, and engineers with an interest in recent developments in the interdisciplinary applications of mathematical analysis.