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2.5 The Notion of Stability; 2.6 Systems with One Degree of Freedom; 2.6.1 Unforced Motion; 2.6.2 Harmonically Forced Motion; 2.7 Epilogue; Problems; 3 Structural Dynamics; 3.1 Uniform String Dynamics; 3.1.1 Standing Wave (Modal) Solution; 3.1.2 Orthogonality of Mode Shapes; 3.1.3 Using Orthogonality; 3.1.4 Traveling Wave Solution; 3.1.5 Generalized Equations of Motion
3.1.6 Generalized Force3.1.7 Example Calculations of Forced Response; 3.2 Uniform Beam Torsional Dynamics; 3.2.1 Equations of Motion; 3.2.2 Boundary Conditions; 3.2.3 Example Solutions for Mode Shapes and Frequencies; 3.2.4 Calculation of Forced Response; 3.3 Uniform Beam Bending Dynamics; 3.3.1 Equation of Motion; 3.3.2 General Solutions; 3.3.3 Boundary Conditions; 3.3.4 Example Solutions for Mode Shapes and Frequencies; 3.3.5 Calculation of Forced Response; 3.4 Free Vibration of Beams in Coupled Bending and Torsion; 3.4.1 Equations of Motion; 3.4.2 Boundary Conditions
3.5 Approximate Solution Techniques3.5.1 The Ritz Method; 3.5.2 Galerkin's Method; 3.5.3 The Finite Element Method; 3.6 Epilogue; Problems; 4 Static Aeroelasticity; 4.1 Wind-Tunnel Models; 4.1.1 Wall-Mounted Model; 4.1.2 Sting-Mounted Model; 4.1.3 Strut-Mounted Model; 4.1.4 Wall-Mounted Model for Application to Aileron Reversal; 4.2 Uniform Lifting Surface; 4.2.1 Steady-Flow Strip Theory; 4.2.2 Equilibrium Equation; 4.2.3 Torsional Divergence; 4.2.4 Airload Distribution; 4.2.5 Aileron Reversal; 4.2.6 Sweep Effects; 4.2.7 Composite Wings and Aeroelastic Tailoring; 4.3 Epilogue; Problems
5 Aeroelastic Flutter5.1 Stability Characteristics from Eigenvalue Analysis; 5.2 Aeroelastic Analysis of a Typical Section; 5.3 Classical Flutter Analysis; 5.3.1 One-Degree-of-Freedom Flutter; 5.3.2 Two-Degree-of-Freedom Flutter; 5.4 Engineering Solutions for Flutter; 5.4.1 The k Method; 5.4.2 The p-k Method; 5.5 Unsteady Aerodynamics; 5.5.1 Theodorsen's Unsteady Thin-Airfoil Theory; 5.5.2 Finite-State Unsteady Thin-Airfoil Theory of Peters et al.; 5.6 Flutter Prediction via Assumed Modes; 5.7 Flutter Boundary Characteristics; 5.8 Structural Dynamics, Aeroelasticity, and Certification
5.8.1 Ground-Vibration Tests

Sommario/riassunto

This text provides an introduction to structural dynamics and aeroelasticity, with an emphasis on conventional aircraft. The primary areas considered are structural dynamics, static aeroelasticity and dynamic aeroelasticity. The structural dynamics material emphasizes vibration, the modal representation and dynamic response. Aeroelastic phenomena discussed include divergence, aileron reversal, airload redistribution, unsteady aerodynamics, flutter and elastic tailoring. More than one hundred illustrations and tables help clarify the text and more than fifty problems enhance student learning. This text meets the need for an up-to-date treatment of structural dynamics and aeroelasticity for advanced undergraduate or beginning graduate aerospace engineering students.

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Sommario/riassunto	New technologies, developments in implant design and advances in surgical technique have improved outcomes after joint replacement and decreased rate of complications. It is not a surprise that the number of arthroplasties increases steadily every year and nowadays more than one million patients undergo the procedure annually worldwide. This book is a sequel of a successful series dedicated to one of the fastest growing fields in orthopedics - arthroplasty. Aiming at dissemination of scientific research this book provides a profound overview of the recent evolution of technology and surgical techniques. New developments of implant design and current treatment strategies have been critically discussed by the contributing authors. The process of improving care for patients and standards of treatment requires straightforward access to up-to-date research and knowledge. The format of the publication allows easy and quick reference to shared ideas and concepts. We hope, that the current book will add significant contribution to the success of this endeavor.