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Titolo	The Slavs in European History and Civilization / Francis Dvoraik
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Pubbl/distr/stampa	Napoli : Stab. tip. Federico Sangiovanni & figlio, 1916
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5 Parallel Shear Flow: the Effects of Viscosity -- 5.1 Conditions for Equilibrium -- 5.2 Conditions for Quasi-Equilibrium: the Frozen Flow Approximation -- 5.3 The Orr-Sommerfeld Equation -- 5.4 Boundary Conditions for Viscous Fluid -- 5.5 Numerical Solution of the Orr-Sommerfeld Equation -- 5.6 Oblique Modes -- 5.7 Shear Scaling and the Reynolds Number -- 5.8 Numerical Examples -- 5.9 Perturbation Energetics in Viscous Flow -- 5.10 Summary -- 6 Synthesis: Viscous, Diffusive, Inhomogeneous, Parallel Shear Flow -- 6.1 Expanding the Basic Equations -- 6.2 Numerical Solution -- 6.3 2D and Oblique Modes: Squire Transformations -- 6.4 Shear and Diffusion Scalings -- 6.5 Application: Instabilities of a Stably Stratified Shear Layer -- 6.6 Application: Analysis of Observational Data -- 6.7 Summary -- 6.8 Further Reading -- 7 Nonparallel Flow: Instabilities of a Cylindrical Vortex -- 7.1 Cyclostrophic Equilibrium -- 7.2 The Perturbation Equations -- 7.3 Barotropic Modes (m = 0) -- 7.4 Axisymmetric Modes (l = 0) -- 7.5 Analytical Example: the Rankine Vortex -- 7.6 Numerical Example: a Continuous Vortex -- 7.7 Wave Interactions in Barotropic Vortices -- 7.8 Mechanisms of Centrifugal and Convective Instabilities -- 7.9 Swirling Flows -- 7.10 Summary -- 7.11 Further Reading -- 8 Instability in a Rotating Environment -- 8.1 Frontal Zones -- 8.2 Geostrophic Equilibrium and the Thermal Wind Balance -- 8.3 The Perturbation Equations -- 8.4 Energetics -- 8.5 The Vertical Vorticity Equation -- 8.6 Analytical Solution #1: Inertial and Symmetric Instabilities -- 8.7 Analytical Solution #2: Baroclinic Instability -- 8.8 Numerical Solution Method -- 8.9 Instability in the Ageostrophic Regime -- 8.10 Summary -- 8.11 Further Reading -- 9 Convective Instability in Complex Fluids -- 9.1 Conditional Instability in a Moist Atmosphere or a Freezing Ocean.
9.2 Double Diffusive Instabilities -- 9.3 Bioconvection -- 9.4 CO[sub (2)] Sequestration -- 10 Summary -- 10.1 Equilibrium States -- 10.2 Instabilities -- Part II The View Ahead -- 11 Beyond Normal Modes -- 11.1 Instability as an Initial Value Problem -- 11.2 Transient Growth in Simple Linear Systems -- 11.3 Computing the Optimal Initial Condition -- 11.4 Optimizing Growth at t = 0[sup(+)] -- 11.5 Growth at Short and Long Times: a Simple Example -- 11.6 Example: The Piecewise Shear Layer -- 11.7 Mechanics of Transient Growth in a Shear Layer -- 11.8 Generalizing the Inner Product -- 11.9 Summary -- 11.10 Appendix: Singular Value Decomposition -- 11.11 Further Reading -- 12 Instability and Turbulence -- 12.1 Secondary Instabilities and the Transition to Turbulence -- 12.2 Turbulence-Driven Instabilities -- 12.3 Cyclic Instability -- 12.4 Further Reading -- 13 Refining the Numerical Methods -- 13.1 Higher-Order Finite Differences -- 13.2 Finite Differences on an Adaptive Grid -- 13.3 Galerkin Methods -- 13.4 The Shooting Method -- 13.5 Generalizations -- 13.6 Further Reading -- Appendix A Homework Exercises -- Appendix B Projects -- References -- Index.

Sommario/riassunto

Instabilities are present in all natural fluids from rivers to atmospheres. This book considers the physical processes that generate instability. Part I describes the normal mode instabilities most important in geophysical applications, including convection, shear instability and baroclinic instability. Classical analytical approaches are covered, while

also emphasising numerical methods, mechanisms such as internal wave resonance, and simple `rules of thumb' that permit assessment of instability quickly and intuitively. Part II introduces the cutting edge: nonmodal instabilities, the relationship between instability and turbulence, self-organised criticality, and advanced numerical techniques. Featuring numerous exercises and projects, the book is ideal for advanced students and researchers wishing to understand flow instability and apply it to their own research. It can be used to teach courses in oceanography, atmospheric science, coastal engineering, applied mathematics and environmental science. Exercise solutions and MATLAB® examples are provided online. Also available as Open Access on Cambridge Core.