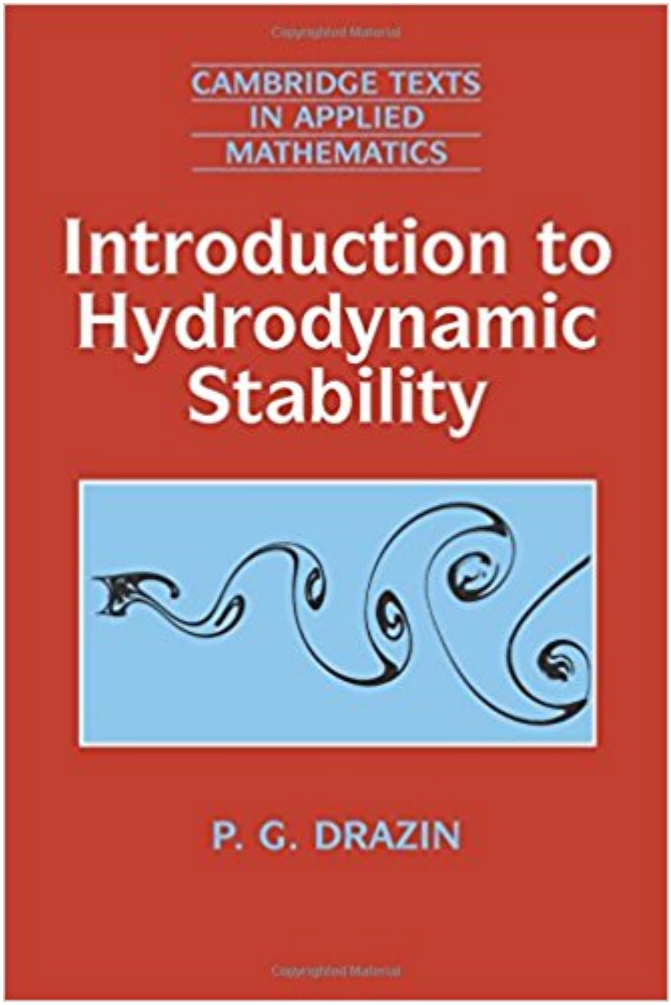
Introduction To Hydrodynamic Stability (Cambridge Texts In Applied Mathematics)



Synopsis

Instability of flows and their transition to turbulence are widespread phenomena in engineering and the natural environment. They are important in applied mathematics, astrophysics, biology, geophysics, meteorology, oceanography, physics, and engineering. This is a graduate-level textbook to introduce these phenomena by modeling them mathematically, and describing numerical simulations and laboratory experiments. The visualization of instabilities is emphasized with many figures. Many worked examples and exercises for students illustrate the ideas of the text. Readers are assumed to be fluent in linear algebra, advanced calculus, elementary theory of ordinary differntial equations, complex variable and the elements of fluid mechanics. The book is aimed at graduate students, but is very useful for specialists in other fields.

Book Information

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Customer Reviews

"Each chapter concludes with a large body of exercises (120 in all), of varying degrees of difficulty. These will be a boon for the instructor who is charged with finding suitable questions for assessment purposes. I found this book to be a very readable introductory textbook, and one which will make an excellent addition to the library of anyone contemplating a graduate level course in hydrodynamic stability." Mathematical Reviews

Instability of flows and their transition to turbulence are widespread phenomena in engineering and

the natural environment, and are important in applied mathematics, astrophysics, biology, geophysics, meteorology, oceanography and physics as well as engineering. This is a textbook to introduce these phenomena at a level suitable for a graduate course, by modelling them mathematically, and describing numerical simulations and laboratory experiments. The visualization of instabilities is emphasized, with many figures, and in references to more still and moving pictures. The relation of chaos to transition is discussed at length. Many worked examples and exercises for students illustrate the ideas of the text. Readers are assumed to be fluent in linear algebra, advanced calculus, elementary theory of ordinary differntial equations, complex variable and the elements of fluid mechanics. The book is aimed at graduate students but will also be very useful for specialists in other fields.

It is a very good book in the subject, there is an awesome amount of content in its small size. A little bit dense, but a classic in the subject of Hydrodynamic Stability.

Drazin was an excellent writer (see Hydrodynamic Stability and Nonlinear Systems), but this book felt very disorganized to me, possibly because he passed away shortly before it's release.The concept is very good: how do we get from instability to full-fleged turbulence, and are we even ready to answer the question? He gives a good explanation of the stability of ODEs, and follows this with a discussion of the standard linear hydrodynamic stability problems (Kelvin-Helmholtz, Rayleigh-BÃƒÂ©nard, etc.). It ends with a discussion of the transition to turbulence.But the problem is that he has already treated most of these topics in his other books, and the earlier treatments were nearly identical in many respects, or they were just plain better. Even regarding the new material on transition to turbulence, I feel that it did not serve to unify the earlier topics as it should have.Some further editing may have greatly improved this book and better underscored the overlying theme, but as it stands I feel that one is better off spending their time on his other books.

One of my favorite courses from grad school, a small book, easy to revisit the topic wiout getting too overwhelmed. Short chapters and just the right amount of pictures. Still seems easy to read today 10 years later. I am not currently working in a field that studies stable/unstable flow but since I cook my own meals I run into practical situations daily.A good read for the modern chef!

Applications: An Introduction to Applied Mathematics (Texts in Applied Mathematics) (v. 11) Introduction to the Foundations of Applied Mathematics (Texts in Applied Mathematics) Hydrodynamic and Hydromagnetic Stability (International Series of Monographs on Physics) Introduction to Aircraft Flight Mechanics: Performance, Static Stability, Dynamic Stability, Classical Feedback Control, and State-Space Foundations (AIAA Education) Introduction to Magnetohydrodynamics (Cambridge Texts in Applied Mathematics) Rarefied Gas Dynamics: From Basic Concepts to Actual Calculations (Cambridge Texts in Applied Mathematics) Numerical Mathematics (Texts in Applied Mathematics) Principles of Mathematical Analysis (International Series in Pure and Applied Mathematics) (International Series in Pure & Applied Mathematics) Nelson Pure Mathematics 2 and 3 for Cambridge International A Level (Nelson Mathematics for Cambridge International a Level) Fractal Geometry and Dynamical Systems in Pure and Applied Mathematics I: Fractals in Pure Mathematics (Contemporary Mathematics) An Introduction to Scientific Computing: Twelve Computational Projects Solved with MATLAB (Texts in Applied Mathematics) Books of Breathing and Related Texts -Late Egyptian Religious Texts in the British Museum Vol.1 (Catalogue of the Books of the Dead and Other Religious Texts in the British Museum) Linear Algebra: An Introduction to Abstract Mathematics (Undergraduate Texts in Mathematics) Cambridge Global English Stage 9 Workbook: for Cambridge Secondary 1 English as a Second Language (Cambridge International Examinations) Markov Chains and Stochastic Stability (Cambridge Mathematical Library) Sailing Theory and Practice. A Scientific Analysis, with 335 Drawings and Photographs of the Aerodynamic, Hydrodynamic and Other Design Factors which Define a Yacht’s Behaviour. Physics of Shock Waves and High-Temperature Hydrodynamic Phenomena (Dover Books on Physics) Hydrodynamic Lubrication, Volume 33: Bearings and Thrust Bearings (Tribology and Interface Engineering)