《流体动力学稳定性》

图书基本信息

书名：《流体动力学稳定性》

13位ISBN编号：9787510040672

10位ISBN编号：7510040671

出版时间：2012-1

出版社：世界图书出版公司

作者：德拉津

页数：605

版权说明：本站所提供下载的PDF图书仅提供预览和简介以及在线试读，请支持正版图书。

更多资源请访问：www.tushu000.com

《流体动力学稳定性》

内容概要

《流体动力学稳定性(第2版)(英文版)》首先详细介绍了这个领域的三大主题：流体稳定性、热对流、旋转和弯曲流和平行切变流；接着讲述平行切变流的数学理论、大量的线性理论应用、分层理论和不稳定性。《流体动力学稳定性(第2版)(英文版)》尽可能多地囊括涉及到的试验和数值理论，重点强调用到的物理方法和技巧以及书中得到的结果。《流体动力学稳定性(第2版)(英文版)》的最大特点是包括了大量的习题，这些习题不仅能够很好的掌握书中的内容，而且也是书中一些疑难知识的更具体解答。

《流体动力学稳定性》

作者简介

作者：（英国）德拉津（P.G.Drazin）

《流体动力学稳定性》

书籍目录

foreword by john miles
preface
1 introduction
1 introduction
2 mechanisms of instability
3 fundamental concepts of hydrodynamic stability
4 kelvin-helmholtz instability
5 break-up of a liquid jet in air
problems for chapter 1
2 thermal instability
6 introduction
7 the equations of motion
the exact equations, 34; the boussinesq equations,35
8 the stability problem
the linearized equations, 37; the boundary condi-tions, 40; normal modes, 42
9 general stability characteristics
exchange of stabilities, 44; a variational principle,45
10 particular stability characteristics
free-free boundaries, 50; rigid-rigid boundaries,51; free-rigid boundaries, 52
11 the cells
12 experimental results
13 some applications
problems for chapter 2
3 centrifugal instability
14 introduction
15 instability of an inviscid fluid
three-dimensional disturbances, 73; axisymmetric disturbances, 77, two-dimensional disturbances, 80
16 instability of couette flow of an inviscid fluid
17 the taylor problem
axisymmetric disturbances, 90; two-dimensional disturbances, 103; three-dimensional disturbances,104; some experimental results, 104
18 the dean problem
the dean problem, 108; the taylor-dean prob-lem, 113
19 the g6rtler problem
problems for chapter 3
4 parallel shear flows
20 introduction
the inviscid theory
21 the governing equations
22 general criteria for instability
23 flows with piecewise-linear velocity profiles
unbounded vortex sheet, 145; unbounded shear layer, 146; bounded shear layer, 147

24 the initial-value problem
the viscous theory
25 the governing equations
26 the eigenvalue spectrum for small reynolds numbers
a perturbation expansion, 159; sufficient conditions for stability, 161
27 heuristic methods of approximation
the reduced equation and the inviscid approxima-tions, 165; the boundary-layer approximation near a rigid wa!l, 167; the wkbj approximations,167; the local turning-point approximations,171; the truncated equation and tollmien's improved viscous approximations, 175; the viscous
correction to the singular inviscid solution, 177
28 approximations to the eigenvalue relation
symmetrical flows in a channel, 181; flows of the boundary-layer type, 183; the boundary-layer approximation to $\phi 3(z)$, 184; the wkbj approxi-mation to $\phi 3(z)$, 185; the local turning-point approximation to $\phi 3(z)$, 188; tollmien's improved approximation to $\phi 3(z)$, 191
29 the long-wave approximation for unbounded flows
30 numerical methods of solution
expansions in orthogonal functions, 203; finite-difference methods, 206; initial-value methods (shooting), 207
31 stability characteristics of various basic flows
plane couette flow, 212; poiseuiile flow in a circular pipe, 216; plane poiseuille flow, 221; combined plane couette and plane poiseuille flow, 223; the blasius boundary-layer profile, 224; the asymptotic suction boundary-layer profile, 227; boundary layers at separation, 229; the falkner-skan profiles, 231; the bickley jet, 233; the hyper- bolic-tangent shear layer, 237
32 experimental results
problems for chapter 4
5 uniform asymptotic approximations
33 introduction
plane couette flow
34 the integral representations of the solutions
35 the differential,equation method
general velocity profiles
36 a preliminary transformation
37 the inner and outer expansions
the inner expansions, 268; the outer expansions,271; the central matching problem, 276; com- posite approximations, 278
38 uniform approximations
the solution of well-balanced type, 280; the solu- tions of balanced type, 280; the solutions of dominant-recessive type, 283
39 a comparison with lin's theory
40 preliminary simplification of the eigenvalue relation
41 the uniform approximation to the eigenvalue relation

a computational form of the first approximation to the eigenvalue relation, 299; results for plane poiseuille flow, 301
42 a comparision with the heuristic approximations to the eigenvalue relation
the local turning-point approximation to φ3(z), 305;tolimien's improved approximation to φ3(z), 306;the uniform approximation to φ3(z) based on the truncated equation, 308; the uniform approxima-tion to φ3(z) based on the orr-sommerfeld equation,3o9
43 a numerical treatment of the orr-sommerfeld problem using compound matrices
symmetrical flows in a channel, 315; boundary-layer flows, 316
problems for chapter 5
6 additional topics in linear stability theory
44 instability of parallel flow of a stratified fluid
introduction, 320; internal gravity waves and ray-leigh-taylor instability, 324; kelvin-helmholtz instability, 325
45 baroclinic instability
46 instability of the pinch
47 development of linear instability in time and space
initial-value problems, 345; spatially growing modes, 349
48 instability of unsteady flows
introduction, 353; instability of periodic flows, 354;instability of other unsteady basic flows, 361
problems for chapter 6
7 nonlinear stability
49 introduction
landau's theory, 370; discussion, 376
so the derivation of ordinary differential systems governing stability
sl resonant wave interactions
internal resonance of a double pendulum, 387;resonant wave interactions, 392
s2 fundamental concepts of nonlinear stability
introduction to ordinary differential equations, 398;introduction to bifurcation theory, 402; structural stability, 407; spatial development of nonlinear stability, 416; critical layers in parallel flow, 420
s3 additional fundamental concepts of nonlinear stability
the energy method, 424; maximum and minimum energy in vortex motion, 432; application of boun-dary-layer theory to cellular instability, 434
s4 some applications of the nonlinear theory
benard convection, 435; couette flow, 442;parallel shear flows, 450
problems for chapter 7
appendix. a class of generalized airy functions
a1 the airy functions ak(z)

a2 the functions an(z, p), bo(z, p) and bk(z, p)
a3 the functions ak(z, p, q) and bk(z, p, q)
a4 the zeros of at(z,p)
addendum: weakly non-parallel theories for the blasius boundary
layer
solutions
bibliography and author index
motion picture index
subject index

《流体动力学稳定性》

章节摘录

版权页： 插图： An important limitation of Landau's theory is due to the assump-tion that the interaction of only one mode and its harmonics need be considered. This assumption is plausible if the igenfunctions of the linearized problem are discrete and simple, so that when the flow is slightly unstable only one normal mode is unstable and all the others decay. When the flow is in an unbounded domain, however, the eigenfunctions depend continuously on a real wavenumber. Then a wavepacket of modes is unstable when the flow is slightly unstable. This in fact occurs for most of the cases we have treated. For example, Fig. 2.2(a) shows that, when a fluid at rest between infinite horizontal planes is heated from below and the Rayleigh number R is slightly supercritical, there is a small band of unstable waves, say a1(R)

《流体动力学稳定性》

编辑推荐

《流体动力学稳定性(第2版)(英文版)》是一部全面流体动力学稳定性的专著。《流体动力学稳定性(第2版)(英文版)》适用于物理、力学专业的研究生、教师和相关的科研人员。

《流体动力学稳定性》

精彩短评

1、专业书籍，必备。和Chanrasekar的书一起读。
2、印刷不清楚，有几页还印刷倒了
3、在当当买书放心 不仅价格便宜 连比较专业的学术书籍都有售 非常满意
4、书的内容肯定不错，以后慢慢研究，这印刷有点差
5、流动不稳定性方面，很综合的一本书，适合做分析和科研用。

《流体动力学稳定性》

版权说明

本站所提供下载的PDF图书仅提供预览和简介，请支持正版图书。

更多资源请访问:www.tushu000.com