

Contents

I.	<u>Introduction</u>	1
	Results from ordinary differential equations; examples of physical systems governed by partial differential equations.	
II.	<u>Nonlinear Elliptic Boundary Value Problems of Second Order</u> . .	14
	Maximum principles. Function spaces. Existence theory of second order elliptic problems. Eigenvalue problems. Monotone iteration schemes. A simple bifurcation problem. An initial value problem. Stability. A singular perturbation problem.	
III.	<u>Functional Analysis</u>	48
	Banach Spaces. The Riesz-Schauder theory. Frechet derivatives. Implicit function theorem. Analytic operators. Decomposition of Vector Fields.	
IV.	<u>Bifurcation at a Simple Eigenvalue</u>	77
	The Navier Stokes equations. Continuation of solutions. Bifurcation - Poincaré-Lindstedt series. Stability of bifurcating solutions.	

V.	<u>Bifurcation of Periodic Solutions</u>	103
	Riesz-Schauder theory for a parabolic operator.	
	Solution of the bifurcation problems. Formal	
	stability of the bifurcating solutions; Floquet	
	exponents. Examples from Chemical Reactor theory.	
VI.	<u>The Mathematical Problems of Hydrodynamic Stability</u>	125
	Lyapounov's theorem for the Navier Stokes	
	equations.	
VII.	<u>Topological Degree Theory and its Applications.</u>	141
	Finite dimensional degree theory. Leray-Schauder	
	degree theory. Bifurcation by Leray-Schauder	
	degree. Theorems of Amann and Rabinowitz.	
VIII.	<u>The Real World.</u>	173
	Examples from hydrodynamics. Bénard and Taylor	
	Problems.	