



## CONTENTS

		PAGE
	“Short historical sketch”	I to II
<b>CHAPTER I.</b>	<b>Fredholm Equations.</b>	<b>1</b>
§ 1.	Concept of integral equations . . . . .	1
§ 2.	Scalar product and norm. Orthogonality	3
§ 3.	Fredholm operator and its degree. Iterated kernel . . . . .	16
§ 4.	Method of successive approximations . . . . .	23
§ 5.	Volterra equations . . . . .	28
§ 6.	Abel equations . . . . .	33
§ 7.	Concept of resolvent . . . . .	38
§ 8.	Systems of linear algebraic equations . . . . .	43
§ 9.	Integral equations with degenerated kernels	46
§ 10.	General case of Fredholm equation . . . . .	49
§ 11.	Conjugate Fredholm equation . . . . .	59
§ 12.	Fredholm theorems . . . . .	64
§ 13.	Resolvent . . . . .	68
§ 14.	The case of several independent variables	75
§ 15.	Equations with weak singularity . . . . .	77
§ 16.	Continuous solutions of integral equations . . . . .	88
§ 17.	Systems of integral equations . . . . .	95
§ 18.	Examples of non-Fredholm integral equations . . . . .	99
<b>CHAPTER II.</b>	<b>Riesz-Schauder Equations</b> . . . . .	<b>105</b>
§ 19.	Fundamental concepts of operators . . . . .	105
§ 20.	Method of successive approximations for equations with conjugate bounded operators	111
§ 21.	Completely continuous operators . . . . .	114
§ 22.	Solution of Riesz-Schauder equations . . . . .	119
§ 23.	Extension of Fredholm theorems . . . . .	122

## CONTENTS

	PAGE
<b>CHAPTER III. Symmetric Integral Equations . . .</b>	<b>124</b>
§ 24. Symmetric kernels . . . . .	124
§ 25. Fundamental theorems on symmetric equations . . . . .	125
§ 26. Theorem on existence of a characteristic constant . . . . .	127
§ 27. Hilbert—Schmidt theorem . . . . .	133
§ 28. Solution of symmetric integral equations .	141
§ 29. Bilinear series . . . . .	144
§ 30. Bilinear series for iterated kernel . . .	147
§ 31. Resolvent of a symmetric kernel . . .	150
§ 32. Extremal properties of characteristic constants and proper functions . . . . .	152
<b>CHAPTER IV. Applications of Integral Equations .</b>	<b>154</b>
§ 33. Integral equations of potential theory in the three dimensional space . . . . .	154
§ 34. Solution of boundary value problems of the potential theory . . . . .	161
§ 35. Solution of the Dirichlet exterior problem	165
§ 36. Equations of potential theory in multi-dimensional spaces . . . . .	167
§ 37. Equations of the plane potential theory .	169
§ 38. Boundary value problem for an ordinary differential equation . . . . .	177
§ 39. Characteristic constants and proper functions of an ordinary differential operator .	184
§ 40. Proof of the Fourier method . . . . .	193
§ 41. Green function for the Laplace operator .	197
§ 42. Proper functions of the problem on vibrations of a membrane . . . . .	206
<b>Exercises . . . . .</b>	<b>213</b>

