

Dedication

To my parents

brothers , sisters , husband and my sons

Acknowledgement

I wish to express my sincere thanks to my supervisor prof. Dr. Shawgy Hussein Abdalla who suggested the title of this thesis and for supervising work and his patience for seeing it throughly to completion. the suggestions and contributions are deeply appreciated.

I wish to thank the Sudan University of Science and Technology , particularly College of Graduate Studies , for giving me the chance to do this research.

Abstract

We show the proper analytic free maps of classical analytic functions. Real analytic families of harmonic functions in a domain with a small hole are studied. The singular integral operators with kernels associated to negative powers of real-analytic functions are discussed and determined.

الخلاصة

أوضحنا الرواسم الحرة التحليلية التامة للدوال التحليلية التقليدية. درسنا العائلات التحليلية الحقيقية للدوال التوافقية في المجال طبقا للنقبة الأصغر. تمت دراسة وتحديد مؤثرات التكامل الشاذة مع النويات المشاركة الى القوى السالبة للدوال التحليلية الحقيقية.

The Contents

Subject	Page Number
---------	-------------

Dedication		I
Acknowledgements		II
Abstract		III
Abstract (Arabic)		IV
The Contents		V
Chapter One		
Analytic Free Maps		
Section (1.1)	Free Maps and a Proper Free Map is Bianaalytic	1
Section (1.2)	Maps In One Variable And Examples	9
Chapter Two		
Real Analytic Families of Harmonic Functions and a domain with Small Hole		
Section (2.1)	Main Results for Real Analytic Families of Harmonic Function on $\Omega(\varepsilon)$	17
Section (2.2)	Some Particular Cases	38
Chapter Three		
Singular Integral Operators with Kernels Associated to Negative Powers of Real-Analytic Functions		
Section (3.1)	Introduction and Theorems in the Multiplicity One Case	42
Section (3.2)	Theorems When the Multiplicity is Greater Than One	49
Chapter Four		
Kernels Associated to Negative power of Real-Analytic Functions		
Section (4.1)	Proofs of Theorems When the Multiplicity is Equal to One	56
Section (4.2)	Proof of Theorems When the Multiplicity is Greater Than One	63
	List of symbol	77
	References	78