

# TABLE OF CONTENTS

	Page
<b>TITLE PAGE</b> .....	<b>i</b>
<b>CERTIFICATE OF PANEL APPROVAL</b> .....	<b>ii</b>
<b>ABSTRACT</b> .....	<b>iii</b>
<b>DEDICATION</b> .....	<b>iv</b>
<b>ACKNOWLEDGMENT</b> .....	<b>v</b>
<b>TABLE OF CONTENTS</b> .....	<b>vii</b>
<b>LIST OF NOTATIONS</b> .....	<b>ix</b>
<b>LIST OF FIGURES</b> .....	<b>xii</b>
 <b>CHAPTER</b>	
 <b>1 INTRODUCTION</b>	 <b>1</b>
1.1 Background of the Study .....	1
1.2 Statement of the Problem .....	4
1.3 Objectives of the Study .....	4
1.4 Methodology .....	5
1.5 Significance of the Study .....	6
 <b>2 PRELIMINARIES</b>	 <b>7</b>
2.1 Strong Derivative .....	7
2.2 McShane and Henstock Integrals .....	17
2.3 Inner Variation .....	26
2.4 The Cantor set $P$ .....	37
 <b>3 EQUI-INTEGRABILITY AND EGOROFF'S THEOREM</b>	 <b>47</b>
3.1 Equi-integrability .....	47
3.2 Egoroff's Theorem .....	79
 <b>4 UNIFORM DIFFERENTIABILITY</b>	 <b>92</b>
4.1 Uniformly Strongly Differentiable .....	92
4.2 Uniformly Differentiability .....	109
 <b>5 LIPSCHITZ AND GENERALIZED AC FUNCTIONS</b>	 <b>111</b>
5.1 Lipschitz Condition .....	111

5.2	Lipschitz and Generalized $AC$ Functions .....	118
<b>6</b>	<b>HARNACK EXTENSIONS</b>	<b>144</b>
6.1	Harnack Extension on Intervals in $\mathbb{R}$ .....	144
6.2	Harnack Extension on Intervals in $\mathbb{R}^2$ .....	182
<b>7</b>	<b>SUMMARY AND RECOMMENDATIONS</b>	<b>190</b>
7.1	Summary .....	190
7.2	Recommendations .....	219
	<b>BIBLIOGRAPHY</b>	<b>220</b>
	<b>CURRICULUM VITAE</b>	<b>222</b>
	<b>CERTIFICATE OF AUTHENTIC AUTHORSHIP</b>	<b>224</b>