

Contents

Title Page	i
Certificate of Approval	v
Certificate	vii
Declaration	ix
Acknowledgements	xi
Abstract	xiii
Contents	xv
List of Symbols	xix
Chapter 1 Introduction	1
Chapter 2 Literature survey	9
2.1 Survey of some iterative methods in $\mathbb{R}$	14
2.1.1 Quadratically convergent methods	15
2.1.2 Higher order methods	16
2.2 Review of some iterative methods in Banach spaces	20
2.2.1 Newton's method and its variants	21
2.2.2 Newton-like methods and its variants	24

Chapter 3	A class of third order derivative free exponential iterative methods for nonlinear equations in $\mathbb{R}$	29
3.1	Introduction	29
3.2	A class of third order derivative free exponential iterative methods	33
3.3	Higher order exponential regula falsi method	40
3.3.1	Higher order exponential regula falsi algorithm	40
3.3.2	Convergence Analysis	43
3.3.3	Numerical Examples	46
3.4	Conclusions	48
Chapter 4	A sixth order method for nonlinear equations in $\mathbb{R}$	49
4.1	Introduction	49
4.2	The Proposed Method	51
4.3	Convergence Analysis	52
4.4	Numerical Examples	54
4.5	Conclusions	57
Chapter 5	Stirling's method for fixed points under Hölder continuous first derivative in Banach spaces	59
5.1	Introduction	59
5.2	Convergence of Stirling's method under the Hölder continuity condition	61
5.2.1	Convergence Analysis	61
5.2.2	Numerical Examples	64
5.3	Convergence of Stirling's method under weak Hölder continuity condition	68
5.3.1	Recurrence Relations	69
5.3.2	Convergence Analysis	73
5.3.3	Numerical Example	74
5.4	Conclusions	78

Chapter 6	Convergence of Stirling's method under ω-continuous first derivative in Banach spaces	79
6.1	Introduction	79
6.2	Stirling's method under ω -condition	81
6.2.1	Recurrence Relations	85
6.2.2	Convergence Analysis	87
6.2.3	Numerical Examples	88
6.3	Stirling's method under weak ω -condition	91
6.3.1	Recurrence Relations	92
6.3.2	Convergence Analysis	96
6.3.3	Numerical Example	97
6.4	Conclusions	100
Chapter 7	A third order Stirling-like method for fixed points under Lipschitz continuous first derivative in Banach spaces	101
7.1	Introduction	101
7.2	A Stirling-like method	103
7.3	Recurrence Relations	107
7.4	Convergence Analysis	110
7.5	Numerical Examples	112
7.6	Conclusions	118
Chapter 8	Convergence of a Stirling-like method under Hölder continuous first derivative in Banach spaces	119
8.1	Introduction	119
8.2	Convergence of the method with R -order $(1 + p)$	121
8.2.1	Recurrence Relations	124
8.2.2	Convergence Analysis	126
8.2.3	Numerical Examples	128
8.3	Convergence of the method with R -order $(2p + 1)$	131
8.3.1	Recurrence Relations	134

8.3.2	Convergence Analysis	136
8.3.3	Numerical Examples	138
8.4	Conclusions	144
Chapter 9	Convergence of a Stirling-like method under ω-continuous first derivative in Banach spaces	145
9.1	Introduction	145
9.2	Recurrence Relations	146
9.3	Convergence Analysis	152
9.4	Numerical Examples	154
9.5	Conclusions	157
	Conclusions and Scope of Future Works	159
	References	161
	List of Publications	175