
TABLE OF CONTENTS

List of Publications	xiii
List of Figures	xv
List of Tables	xvii
1 Introduction	1
1.1 Fundamental Building Blocks of Matter	1
1.2 Quantum Chromodynamics: The Theory of Strong Interactions	6
1.3 Deep Inelastic Scattering	9
1.4 DIS Cross Section and Structure Functions	12
1.5 Parton Distribution Functions	16
1.6 QCD Evolution Equations	18
1.7 Gluon Saturation at Small- x	23
1.8 High Energy Experiments and PDF Groups	27
1.9 Outline of the Thesis	35
Bibliography	37
2 BK Equation and its Analytical Solution	47
2.1 Introduction	47
2.2 BK Equation	50
2.3 Homotopy Perturbation Method	54

2.4 Analytical Solution to BK Equation	56
2.5 Summary	61
Bibliography	64
3 Proton Structure Function and Gluon Density from BK Equation	69
3.1 Introduction	70
3.2 Proton's Structure function in the Color Dipole Description	72
3.3 Results and Discussion	76
3.4 Summary	80
Bibliography	82
4 Exclusive Vector Meson Production through BK Evolution	88
4.1 Introduction	89
4.2 Exclusive Vector Meson Production within Color Dipole Description of DIS	94
4.2.1 Dipole Scattering Amplitude for Vector Mesons	94
4.2.2 Vector Meson Wavefunctions	97
4.3 Results and Discussion	100
4.4 Summary	105
Bibliography	107
5 Conclusion and Outlook	114