## Contents

S.1	. Topics	Page
	List of figures	iii-iv
	List of tables	v
1.	Chapter-I Introduction	1
1.1	Moving boundary problems	1
1.2	Literature review	2
1.3	Some methods	6
1.4	Caputo fractional derivatives	11
2.	Chapter-II Homotopy perturbation method for a limit case	
	Stefan problem governed by fractional diffusion equation.	13
2.1	ntroduction	13
2.2	The shoreline model	16
2.3	Mathematical formulation for a limit case	18
2.4	Solution of the problem by HPM	19
2.5	Numerical comparison and discussion	22
2.6	Conclusion	31
3.	Chapter-III An approximate solution to a moving boundary	
	problem with space- time fractional derivatives in fluvio-deltaic	
	sedimentation process.	32
3.1	ntroduction	32
3.2	The fluvio-deltaic sedimentation model	35
3.3	The fractional model	37
3.4	Solution of the problem by Adomian decomposition method	38
3.5	Numerical comparison and discussion	42
3.6	Conclusion	48
4.	Chapter-IV An approximate approach for a Stefan problem	

with periodic boundary condition	49
4.1 Introduction	49
4.2 Mathematical model	50
4.3 Solution of the Problem by ADM	52
4.4 Numerical discussion	56
4.5 Conclusion	57
5. Chapter-V An approximate approach for a Stefan problem	
governed with space time fractional derivatives	61
5.1 Introduction	61
5.2 Mathematical formulation	62
5.3 Solution of the problem	63
5.4 Numerical results and discussion	69
5.5 Conclusion	75
6. Chapter-VI Comparison between Adomian decomposition	
method and optimal homotopy asymptotic method for	
a two moving boundaries problem	76
6.1 Introduction	76
6.2 Mathematical model	78
6.3 Solution of the problem by Adomian decomposion method	80
6.4 Solution by optimal homotopy asymptotic method	84
6.5 Numerical discussion and comparison	91
6.6 Conclusion	
<ul> <li>Bibliography</li> </ul>	101
<ul> <li>List of publications</li> </ul>	•••