
*the theory and
applications of
iteration methods*

Ioannis K. Argyros
Ferenc Szidarovszky



CRC Press

Boca Raton Ann Arbor London Tokyo

Contents

Preface	vii
1 The convergence of algorithmic models	1
1.1 Algorithmic models	1
1.2 Convergence criteria for algorithmic models	4
1.3 Applications	10
Exercises	41
2 The convergence of iteration sequences	45
2.1 The general convergence theorem	45
2.2 Convergence of 1-step methods	47
2.3 Convergence of single-step methods	51
2.4 Convergence of single-step methods with differentiable iteration functions	55
2.5 Case studies	60
Exercises	119
3 Monotone convergence	123
3.1 General results	123
3.2 A general model in linear spaces	124
3.3 Case studies	129
Exercises	153
4 Comparison theorems	157
4.1 General results	157
4.2 Comparison to fixed points	159
4.3 Case studies	160
Exercises	178
5 The convergence of Newton methods and their variants	181
5.1 Convergence analysis and Pták error estimates	181
5.2 Convergence with a nondifferentiable term	190
5.3 Convergence of Newton-like methods	191
5.4 Case Studies	194
Exercises	321

6 The monotone convergence of Newton methods and their variants	325
6.1 Monotone convergence of Newton-like methods	325
6.2 A lattice theoretical fixed point theorem.....	337
6.3 Case studies	339
Exercises	343
References	345
Index	351