# Contents

1 Introduction  

2 Preliminary Concepts  
   2.1 Definitions and Basic Concepts  
   2.2 Chapter summary  

3 Similarity Concept  
   3.1 Introduction  
   3.2 Proximity and Similarity relations  
   3.3 Similarity measure – a brief review  
   3.4 Similarity indices  
   3.5 Performance of different similarity measures  
   3.6 Chapter summary  

4 Similarity-based Approximate Reasoning  
   4.1 Introduction  
   4.2 Similarity-based approximate reasoning  
      4.2.1 A brief review  
      4.2.2 Proposed method  
   4.3 Application to Different Models  
      4.3.1 Rule-based models  
      4.3.2 Resolution-based models  
      4.3.3 Experimental Results  
   4.4 Chapter summary  

5 Inverse Approximate Reasoning  
   5.1 Introduction  
   5.2 Method with single rule:  
      5.2.1 Method using rule equivalent  
      5.2.2 Buckley’s Method  
      5.2.3 Method with the principle of Maximum Entropy  
      5.2.4 Method based on Fuzzy Abduction  
   5.3 Method with multiple rules with a single clause  
   5.4 Proposed method  
      5.4.1 Method with Rule equivalent  
      5.4.2 Similarity based Inverse Approximate Reasoning – SIAR
## Contents

5.4.3 Method using cylindrical extension and projection—INAR .......................................................... 141
5.4.4 Inverse approximate reasoning—multiple rules with a single clause ........................................... 145
5.5 Experimental Results ......................................................... 147
5.6 Chapter summary ............................................................. 150

6 Approximate Reasoning in Fuzzy Resolution .................................................................................... 153
   6.1 Introduction ................................................................. 154
   6.2 Fuzzy Resolution ......................................................... 157
   6.3 Extended Fuzzy Resolution ........................................... 165
   6.4 Artificial Example ....................................................... 169
   6.5 Chapter summary ........................................................ 174

7 Case Studies ........................................................................... 175
   7.1 Introduction ................................................................. 176
   7.2 DC Motor ..................................................................... 177
   7.3 Behaviour of a DC Motor .............................................. 182
      7.3.1 Experimental studies of a DC Series motor ........ 182
      7.3.2 Experimental studies on a DC Shunt motor .......... 188
   7.4 Chapter summary ........................................................ 190

8 Conclusion ................................................................. 199
   8.1 Scope for further research .......................................... 201

A Programming Of INAR ............................................................ 203

Bibliography ................................................................. 215