TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>INNER FIRST PAGE</td>
<td>i</td>
</tr>
<tr>
<td>DECLARATION BY THE SCHOLAR</td>
<td>ix</td>
</tr>
<tr>
<td>SUPERVISOR’S CERTIFICATE</td>
<td>x</td>
</tr>
<tr>
<td>ACKNOWLEDGEMENTS</td>
<td>xi</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>xiii</td>
</tr>
<tr>
<td>LIST OF ABBREVIATIONS</td>
<td>xiv</td>
</tr>
<tr>
<td>LIST OF SYMBOLS</td>
<td>xv</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>xvi</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>xvii</td>
</tr>
</tbody>
</table>

CHAPTER-1

INTRODUCTION 1-19

1.1 HISTORICAL DEVELOPMENTS 1

1.2 INFORMATION THEORETIC MEASURES 3

   1.2.1. ENTROPY MEASURES 3
   1.2.2. DIVERGENCE MEASURES 5
   1.2.3. INFORMATION GENERATING FUNCTIONS 7
CHAPTER-2

A NEW PARAMETRIC INFORMATION GENERATING FUNCTION

20-32

2.1 INTRODUCTION

20

2.2 NEW INFORMATION GENERATING FUNCTION

22

2.3 PARTICULAR CASES OF INFORMATION GENERATING
FUNCTIONS $I_\alpha(P,U)$ FOR DIFFERENT PROBABILITY
DISTRIBUTIONS

24
### 2.3.1. UNIFORM PROBABILITY DISTRIBUTION AND CONSTANT UTILITY DISTRIBUTION

2.3.2. GEOMETRIC PROBABILITY DISTRIBUTION AND CONSTANT UTILITY DISTRIBUTION

2.3.3. \( \beta \)-POWER PROBABILITY DISTRIBUTION AND CONSTANT UTILITY DISTRIBUTION

2.4 CHARACTERIZATION OF RELATIVE INFORMATION

GENERATING FUNCTION AND INFORMATION IMPROVEMENT

GENERATING FUNCTION

2.5 PROPERTIES AND RELATION AMONG INFORMATION

GENERATING FUNCTIONS

2.6 CONCLUSION

### CHAPTER-3

TWO NEW ENTROPY MEASURES AND THEIR APPLICATIONS IN DROUGHT RISK ASSESSMENT FOR BETTER WATER MANAGEMENT

3.1. INTRODUCTION

3.2. NEW PARAMETRIC LOGARITHMIC ENTROPY MEASURE
3.2.1. PROPERTIES OF PROPOSED PARAMETRIC LOGARITHMIC ENTROPY MEASURE $H^k_l(P)$

3.2.2. BOUNDS OF $H^k_l(P)$

3.3. NEW PARAMETRIC EXPONENTIAL ENTROPY MEASURE

3.3.1. PROPERTIES OF PARAMETRIC EXPONENTIAL ENTROPY FUNCTION $H^k_e(P)$

3.3.2. SIMILARITY INDEX AND RATE OF SIMILARITY

3.4. APPLICATION OF RISK VALUATION OF WATER SECURITY DURING DROUGHT PERIOD BY EW-TOPSIS APPROACH

3.4.1. ALGORITHM FOR DETERMINING THE WEIGHT

3.4.2. RISK EVALUATION FOR WATER SECURITY IN A DROUGHT REGION BY THE EW-TOPSIS APPROACH

3.4.3. CASE STUDY OF HAIHE RIVER BASIN

3.5. CONCLUSION

CHAPTER 4

APPLICATION OF NEW GENERALIZED MEASURE OF FUZZY DIVERGENCE IN MULTI-CRITERIA DECISION MAKING

4.1. INTRODUCTION

4.2. PROPOSED DIVERGENCE MEASURE

4.2.1. PROPERTIES OF PROPOSED FGJED
### CHAPTER 4

#### 4.3. APPLICATION OF FGJED TO MULTICRITERIA DECISION MAKING PROBLEM

- **4.3.1. PROBLEM DESCRIPTION**
- **4.3.2. ALGORITHM**

#### 4.4. CONCLUSION

![Page vi](image-url)

### CHAPTER 5

#### STUDY ON DIVERGENCE MEASURE FOR INTUITIONISTIC FUZZY SETS AND ITS APPLICATION IN MEDICAL DIAGNOSIS

- **5.1 INTRODUCTION**
- **5.2 REVIEW OF INTUITIONISTIC FUZZY DIVERGENCE MEASURES**
- **5.3 NEW INTUITIONISTIC FUZZY DIVERGENCE MEASURE**
  - **5.3.1 PROPERTIES OF THE PROPOSED INTUITIONISTIC FUZZY DIVERGENCE MEASURE**
- **5.4 APPLICATIONS IN MEDICAL DIAGNOSIS**
- **5.5 CONCLUSION**

### CHAPTER 6

#### DECISION MAKING IN MEDICAL INVESTIGATIONS USING NEW PARAMETRIC DIVERGENCE MEASURE FOR INTUITIONISTIC FUZZY SETS
6.1 INTRODUCTION 95

6.2 NEW INTUITIONISTIC FUZZY DIVERGENCE MEASURE 96

6.2.1 PROPERTIES OF THE PROPOSED INTUITIONISTIC FUZZY DIVERGENCE MEASURE 97

6.3 MEDICAL DIAGNOSIS PROBLEM 104

6.3.1 DISCUSSION 113

6.4 CONCLUSION 114

CHAPTER 7

A NEW INTUITIONISTIC FUZZY ENTROPY MEASURE AND ITS APPLICATION IN MULTI-CRITERIA DECISION MAKING 115-126

7.1. INTRODUCTION 115

7.2. A NEW INTUITIONISTIC FUZZY ENTROPY MEASURE 115

7.2.1. NUMERICAL EXAMPLES 120

7.3. APPLICATION IN SELECTION OF MOBILE PHONES 123

7.3.1. NUMERICAL ILLUSTRATION 123

7.3.2. ALGORITHM 124

7.4. CONCLUSION 126

CHAPTER 8

CONCLUSION AND FUTURE SCOPE 127-129
8.1. CONCLUSION

8.2. FUTURE SCOPE

BIBLIOGRAPHY

LIST OF PUBLICATIONS

SYNOPSIS