DECLARATION

Department of Philosophy

University of Madras

Chennai – 600 005.

February, 2013.

I hereby declare that the thesis ‘Methodology of Science: An Examination of Popper and Lakatos from the standpoint of Theory Dependent Observation’ submitted for the Degree of Doctor of Philosophy is a record of independent research work done by me during the period of the study, and that the thesis has not formed the basis for the award of any degree, diploma, associateship or other similar titles.

Prasannakumar E.M.
ACKNOWLEDGEMENTS

I acknowledge the deepest gratitude to the unconditional help that I received from my teachers, friends and benefactors at various stages of writing the thesis. May I place on record the assistance rendered by the following:

First and foremost to my Supervisor and Guide, **Prof. S. Panneerselvam**, whose encouragement, support and valuable suggestions helped me complete my thesis.

I thankfully acknowledge the generous encouragement and support rendered by my former Head of the Department, **Prof. R. Gopalakrishnan**, and other faculty members of the department of Philosophy, **Prof. G. Mishra, Dr. M. Venkatachalapathy, Dr. A.D.Revathy**, former Assistant Lecturer, **Dr. Antony L. SavariRaja** and **Dr. G.Patrick**, Head in charge of Christian Studies Department and Member of my Doctoral Committee.

My sincere gratitude to the Librarians and library staffs of University of Madras, Connemara Public Library, British Council, American Information Resource Center, Pondicherry University, Calicut University and Shankaracharya Sanskrit University in providing the necessary material that helped in constructing the study.

I thank the administrative staffs of the Department of Philosophy and University of Madras for their assistance in providing administrative support required during my research.

I thank the Indian Council of Philosophical Research, for awarding me the Junior Research Fellowship and also University Grant Commission for conducting and approving me eligible for NET.

I also treasure the fond memories of goodwill, assistance and encouragement extended by all my fellow colleagues, friends and well wishers for their constant motivation and inspiration to carry out this work.

I wish to express special gratitude to my family members who bestowed their blessing for completion of this research work.
## CONTENTS

**Introduction**

- Introducing Popper and Lakatos
- Problem: Methodology of science
- Tool of investigation: The theory Dependent Observation
- Analysis of Popper and Lakatos on the basis of Theory Dependent Observation
- The scope of the thesis
- Research Methodology
- Chapertization

**Chapter I  A Brief History of Methodology of Science**

1.1 Aristotle’s contribution to the methodology of Science
1.2 Islamic Philosophers’ Contribution to the Methodology of Science
1.3 Methodology of Science and the Renaissance
1.3.i Francis Bacon
1.3.ii Galileo and other scientists
1.4 Development of Scientific Method in the Nineteenth Century
1.5 Induction and its problems
1.5.1 Induction
1.5.2 Hume’s Problems
1.5.3 Induction and Probability theories
1.6 Popper’s Falsifiability
1.7 Methodology of Lakatos’ Research Programmes
1.8 Methodology of Paradigms
1.9 Fayerband’s contribution to methodology of science

**Chapter II  The Relation between Theory and Observation**

2.1 Concept of pure observation
2.2 Observation statements
2.2.i Protocol Sentences: Carnap
2.2.ii Protocol Sentences: Neurath
2.2.iii Basic Statements: Popper
Chapter III  Critique of Popper on Theory Dependent Observation

3.1  Analysis of Foundational Problems
3.1.i  Science Starts with Problems
3.1.i.a  Inborn Expectations
3.1.i.b  Conjecture or Hypothesis
3.1.i.b.a  Scientific knowledge is doxa
3.1.i.b.b  No Logical Method to Arrive at a Theory
3.1.i.iii  Theories
3.1.i.iii.a  Causal Explanations
3.1.i.iii.b  Universality of Statements
3.1.i.iii.c  Relation between Strictly Universal and Strictly Existential Statements
3.1.i.iii.d  Theoretical Systems and Axioms
3.1.i.iii.e  Statements and Levels of Universality
3.1.iv  Refutations
3.1.v  The Demarcation Problem and Falsifiability
3.1.vi  Analysis of Popper’s foundational Problems
3.2  Analysis of Methodological Problems
3.2.i  Deductively testing a Hypothesis or a Theory
3.2.ii  Experimental tests of hypothesis
3.2.iii  Degree of falsifiability, clarity and precision to give theory appraisal
3.2.iii.a  Bold conjecture, Clarity and Precision
3.2.iii.b  Measures to Test the Degree of Falsifiability
3.2.iv  Confirmation, corroboration and falsification
3.2.v  Critically analyzing the Methodology of falsification
3.3  Analysis of Axiological Problems
3.3.i  Progress of science
3.3.i.a  Epistemological Approaches towards the growth of Knowledge
Chapter IV  
**Critique of Lakatos on Theory Dependent Observation**  
4.1  Analysis of Foundational Problems  
4.1.i  Integration of Historical Analysis and Science  
4.1.ii  Dogmatic Falsificationism  
4.1.iii  Methodological Falsificationism  
4.1.iv  Sophisticated Methodological Falsificationism  
4.1.v  Research Programme and its Components  
4.1.v.a  Hard core  
4.1.v.b  Auxiliary Hypotheses, Protective Belt and Initial Conditions  
4.1.v.c  Positive heuristic and negative heuristic  
4.1.vi  Theory dependent observation and the language of the theory  
4.1.vii  Lakatos foundational problems: A critique  
4.2  Analysis of Methodological Problems  
4.2.i  Work within a research programme  
4.2.ii  Progressive and Degenerative Research Programmes  
4.2.iii  Testing the Methodology Against History  
4.2.iv  Lakato’s methodology: A Critique  
4.3  Analysis of Axiological Problems  
4.3.i  Progress associated with Research Programmes  
4.3.ii  No programme is degenerated beyond hope  
4.3.iii  Lakatos axiological stand point: A Critique  
4.4  Critical of Theory Dependent Observation and Methodology of Research Programmes  

Chapter V  
**Analysis of Popper and Lakatos on Theory Dependent Observation and Methodology of Research Programmes**  
5.1  Popper and Lakatos on theory dependent observation  
5.2  Demarcation of Problem: Comparison of Popper and Lakatos
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.3</td>
<td>Popper’s metaphysical research programmes</td>
<td>173</td>
</tr>
<tr>
<td>5.4</td>
<td>Comparing the methodologies of Popper and Lakatos</td>
<td>176</td>
</tr>
<tr>
<td>5.5</td>
<td>Crucial Experiments: Comparison of Popper and Lakatos</td>
<td>179</td>
</tr>
<tr>
<td>5.6</td>
<td>Difficulties in Methodology of science</td>
<td>180</td>
</tr>
<tr>
<td>5.7</td>
<td>What is the methodology of science?</td>
<td>180</td>
</tr>
</tbody>
</table>

**Conclusion**

**Bibliography**

i