# Table of Contents

Summary of the Thesis v

List of Publications xiii

List of Symbols xv

List of Figures xviii

List of Tables xix

1 Introduction 1

1.1 Brief History of Graph Theory 2

1.2 Basic Definitions 4

1.3 Brief Introductory Note On Graph Labeling 7

1.4 Why Additive Labeling is Interesting? 10

1.5 Different Types of Additive Labeling 10

1.6 Some Motivational Results on Graph Labeling 13

1.7 Historical Background of Magic Labeling of Graphs 19

1.8 Different Types of Magic Labeling of Graphs 22

2 (1,1), (1,0) and (0,1) Edge-Magic/Vertex-Magic Graphs 27
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>A Brief Introductory Note</td>
<td>28</td>
</tr>
<tr>
<td>2.2</td>
<td>Some Results on (1,1) Edge-Magic Graphs</td>
<td>29</td>
</tr>
<tr>
<td>2.3</td>
<td>Some Results on (1, 0) and (0, 1) Edge-Magic Graphs</td>
<td>52</td>
</tr>
<tr>
<td>2.4</td>
<td>(1,1), (1,0) and (0,1) Vertex-Magic Labeling</td>
<td>57</td>
</tr>
<tr>
<td>2.5</td>
<td>Concluding Remarks</td>
<td>59</td>
</tr>
<tr>
<td>3</td>
<td>(1,1), (1,0) and (0,1) Antimagic Graphs</td>
<td>62</td>
</tr>
<tr>
<td>3.1</td>
<td>A Brief Introductory Note</td>
<td>63</td>
</tr>
<tr>
<td>3.2</td>
<td>Some Results on (1, 1) Vertex/Edge Antimagic Graphs</td>
<td>63</td>
</tr>
<tr>
<td>3.3</td>
<td>Some Results on (1, 0) Vertex/Edge Antimagic Graphs</td>
<td>65</td>
</tr>
<tr>
<td>3.4</td>
<td>Some Results on (0, 1) Vertex/Edge Antimagic Graphs</td>
<td>69</td>
</tr>
<tr>
<td>3.5</td>
<td>Concluding Remarks</td>
<td>72</td>
</tr>
<tr>
<td>4</td>
<td>Path Sequential Graphs</td>
<td>74</td>
</tr>
<tr>
<td>4.1</td>
<td>A Brief Introductory Note</td>
<td>75</td>
</tr>
<tr>
<td>4.2</td>
<td>Some Results on Odd Path k-Sequential/Even Path k-Sequential of Graphs</td>
<td>76</td>
</tr>
<tr>
<td>4.3</td>
<td>Some General Results</td>
<td>78</td>
</tr>
<tr>
<td>4.4</td>
<td>Concluding Remarks</td>
<td>86</td>
</tr>
<tr>
<td>5</td>
<td>Some Applications</td>
<td>87</td>
</tr>
<tr>
<td>5.1</td>
<td>A Brief Introductory Note</td>
<td>88</td>
</tr>
<tr>
<td>5.2</td>
<td>Sidon Sets and (1,1) Edge-Magic Graphs</td>
<td>88</td>
</tr>
</tbody>
</table>
5.3 Face Magic Labeling .................................................. 89
5.4 Some Types of Face Magic Labeling of Graphs ............... 91
5.5 Concluding Remarks .................................................. 91

Bibliography ............................................................... 93
LIST OF PUBLICATIONS

International Journals


4. V. Yegnanarayanan and P. Vaidhyanathan, A Note on Magic Graphs, Journal of Combinatorial Mathematics and Combinatorial Computing (JCMCC), accepted for publication on 11-08-2014, to appear in the special issue of JCMCC with guest editors Dr. Sr. Jasintha quadras, Dr. Indira Rajasingh and Dr. Paul Manuel.
International Conference


National Conference

7. V. Yegnanarayanan and P. Vaidhyanathan, On Additive Labeling of Graphs, Fifth Annual Instructional Conference of ADMA and Graph Theory Day V, Department of Mathematics, Periyar University, Salem, June 8-10 (2009).
LIST OF SYMBOLS

$A^n_m$ - Anti prism
$\in$ - Belongs to
$B_i$ - Book graph on $i$ vertices
$|N(u)|$ - Cardinality of the neighbor set of a vertex $u$
$\times$ - Cartesian Product
$S_{n_1,\ldots,n_r}$ - Caterpillar graph
$\lceil \rceil$ - Ceiling value
$K_{m,n}$ - Complete bipartite graph
$K_n$ - Complete graph with $n$ vertices
$G^c$ - Complement of $G$
$\cong$ - Congruence to
$\odot$ - Crown product
$C_n$ - Cycle graph with $n$ vertices
$\text{deg}(u)$ - Degree of the vertex $u$
$\notin$ - Does not belongs to
$=$ - Equal to
$F_n$ - Fan graph on $n$ vertices
$\lfloor \rfloor$ - Floor value
$\forall$ - For all
$f_n$ - Friendship graph on $n$ vertices
$C_m \odot K_{1,n}$ - Generalized crown graph

$P(n, m)$ - Generalized Peterson graph

$\geq$ - Greater than or equal to

$>$ - Greater than to

$H(m)$ - Helm graph

$\cap$ - Intersection

$\rho$ - Irreflexive symmetric relation

$G \vee H$ - Join of Graphs $G$ and $H$

$\leq$ - Lesser than or equal to

$<$ - Lesser than to

$\Delta(G)$ - Maximum degree of $G$

$\delta(G)$ - Minimum degree of $G$

$M_p$ - Mobius Ladder graph

$nG$ - $n$ copies of $G$

$Q_n$ - $n$ dimensional cube

$P_n$ - Path on $n$ vertices

$C_m \times P_n$ - Prism

$\Pi$ - Product

$\rightarrow$ - Right arrow

$N(u)$ - Set of all neighbors of the vertex $u$

$E(G)$ - Set of edges in graph $G$

$\mathbb{Z}$ - Set of integers
\( V(G) \) - Set of vertices in graph \( G \)

\( S_i \) - Star graph with \( i \) leaves

\( \subseteq \) - Subset

\( \Sigma \) - Summation

\( \exists \) - There exists

\( \cup \) - Union

\( W_n \) - Wheel graph with \( n \) spokes

\( G \ast H \) - Wreath product
List of Figures

2.1 Illustrates the algorithm for $G_2$ of Theorem 2.2.10 . . . . . . . . . . . 33

2.2 Illustrates the algorithm for $G_2 \odot K_{1,n}$ of Theorem 2.2.11 . . . . . . 34

2.3 An example for a (0, 1) vertex-magic labeling . . . . . . . . . . . . . . 59

2.4 A (0, 1) vertex-magic labeling for $K_{3,3}$ . . . . . . . . . . . . . . 59
List of Tables

2.1 Complete vertex labels of $G'$ extending $K_p$ with $p = 10$ . . . . . . . . 47
2.2 Complete vertex labels of $G'$ extending $K_p$ with $p = 11$ . . . . . . . . 48
2.3 Complete vertex labels of $G'$ extending $K_p$ with $p = 12$ . . . . . . . . 49