

Contents

1	Introduction	1
1.1	Some preliminaries on graph	1
1.2	Fuzzy sets	6
1.3	Fuzzy graphs	7
1.3.1	Fuzzy intersection graph	9
1.3.2	Fuzzy hypergraphs	10
1.3.3	Fuzzy planar graph	10
1.3.4	Bipolar fuzzy graph	11
1.3.5	m -polar fuzzy graph	11
1.4	Review of literature	12
1.5	Motivation of the work	14
1.6	Summary	16
2	Types of vertices in m-polar graphs	17
2.1	Introduction	17
2.2	Generalized m -polar fuzzy graphs	17
2.3	m -polar fuzzy path and connectedness	19
2.4	Strong and superstrong m polar fuzzy vertices of m PF graphs	21
2.5	An application	27
2.6	Summary	29
3	Types of arcs in m-polar fuzzy graphs	31
3.1	Introduction	31
3.2	m -polar fuzzy bridges and m -polar fuzzy cut nodes	32
3.3	m -polar fuzzy trees and m -polar fuzzy forests	35

3.4	Different types of arcs and their results	40
3.5	An application	48
3.6	Summary	52
4	Genus value of m-polar fuzzy graphs	53
4.1	Introduction	53
4.2	Embedding of m -polar fuzzy graph	53
4.2.1	Relation between the plane and sphere of an m -polar fuzzy graph	54
4.3	Genus value of m -polar fuzzy graphs	54
4.3.1	Isomorphism of m -polar fuzzy genus graph	60
4.3.2	Euler polyhedral equation for m -polar fuzzy genus graphs	61
4.4	m -polar fuzzy genus value in topological surface	62
4.5	Summary	64
5	Detour g-interior nodes in m-polar fuzzy graphs	65
5.1	Introduction	65
5.2	m PF detour g distance, g periphery and g eccentric subgraph	66
5.3	m PF detour g boundary node and g interior node of an m PFG	71
5.4	Application	75
5.5	Summary	77
6	Connectivity index of m-polar fuzzy graphs	79
6.1	Introduction	79
6.2	Connectivity index of m PFG	79
6.3	Boundedness of connectivity index of m Polar fuzzy graph	81
6.4	Find connectivity index of edge deleted m -polar fuzzy subgraph	84
6.5	Average connectivity index of a m PFG	87
6.6	Summary	91
7	Dombi m-polar fuzzy graphs	93
7.1	Introduction	93
7.2	Some preliminaries	93
7.3	Dombi m -polar fuzzy graph	95
7.4	Products on Dombi m -polar fuzzy graphs	95

CONTENTS	iii
7.4.1 Direct product on Dombi m -polar fuzzy graphs	95
7.4.2 Cartesian product of two Dombi m -polar fuzzy graph	97
7.5 Summary	113
9 Conclusion	115