

# List of Figures

2.1	A 3PFG $G$ . . . . .	18
2.2	A 3PFG $G$ . . . . .	19
2.3	Illustration of example 2.3.2. . . . .	20
2.4	Strong $m$ PFV in $G$ . . . . .	21
2.5	Superstrong $m$ PFV in $G$ . . . . .	22
2.6	A 3PFG $G$ of a road network. . . . .	28
3.1	The arc $(q', s')$ is bridge of $G$ . . . . .	32
3.2	The vertex $s'$ is a $m$ PFCN of $G$ . . . . .	33
3.3	Illustration of example 3.3.1. . . . .	36
3.4	Illustration of example 3.3.2. . . . .	37
3.5	Different types of arc on $m$ PFG $G$ . . . . .	41
3.6	A 3PF graph $G$ of a social network . . . . .	51
3.7	A 3PF graph $G$ of a road network. . . . .	52
4.1	Embedding of a 3PFG in sphere . . . . .	55
4.2	3PFG . . . . .	55
4.3	Corresponding 3PFGG . . . . .	56
4.4	The grid network . . . . .	62
4.5	Intersection of edges in grid network . . . . .	63
4.6	Torus graph . . . . .	64
5.1	Connected 3PFG $G$ . . . . .	66
5.2	Connected 3PFG $G$ and its $Per_{3PFD_g}(G)$ . . . . .	68
5.3	Connected 3PF graph $G$ with boundary nodes $\{a, c, f, g\}$ . . . . .	71
5.4	Connected $m$ PFG $G$ . . . . .	72

5.5	Connected $m$ PFPG $G$ . . . . .	75
5.6	3PFPG $G$ corresponding to the communication between some towns. . .	76
6.1	An $m$ PFPG $G$ . . . . .	80
6.2	An $m$ PFPG $G$ . . . . .	83
6.3	A Connected 3PF graph $G$ with its $m$ PFSG $G'$ and $G''$ . . . . .	85
6.4	A Connected 3PFPG $G$ . . . . .	88
7.1	Dombi 3PFPG $G$ . . . . .	95
7.2	Direct product of two Dombi 3PFPG $G_1$ and $G_2$ . . . . .	96
7.3	Cartesian product of two Dombi 3PFPG $G_1$ and $G_2$ . . . . .	98
7.4	cartesian product of two Dombi 3PFEG $G_1$ and $G_2$ . . . . .	100
7.5	Semi strong product of two Dombi 3PFEG $G_1$ and $G_2$ . . . . .	102
7.6	Strong product of two Dombi 3PFEG $G_1$ and $G_2$ . . . . .	103
7.7	Lexicographic product of two Dombi 3PFEG $G_1$ and $G_2$ . . . . .	105
7.8	Union of two Dombi 3PFPG $G_1$ and $G_2$ . . . . .	106