

# List of Tables

<b>Table</b>	<b>Caption</b>	<b>Page no.</b>
3.1	Eigenvalues obtained in different cases in grid-tied AC microgrid model	64
4.1	Eigenvalues of AC microgrid model	82
4.2	Parameters of the ABC Algorithm for AC microgrid in autonomous mode	90
4.3	ISE and ITAE for all transfer functions for autonomous AC microgrid.	93
4.4	Impulse, step and ramp errors for AC microgrid transfer functions	94
4.5	Gain margin and phase margin of full order and reduced order autonomous microgrid	96
4.6	Parameters of the ABC Algorithm for AC microgrid in grid-tied mode	98
4.7. A	ISE for all the transfer functions of grid-tied AC microgrid.	99
4.7. B	ITAE for all the transfer functions of grid-tied AC microgrid	100
4.8. A	Gain margin of reduced order models in comparison to the original AC microgrid system in grid-tied mode	103
4.8. B	Phase margin of reduced order models in comparison to the original AC microgrid system in grid-tied mode	104
4.9	Statistical analysis of fitness values attained through PSO and ABC algorithm in each iteration and CPU time for optimization	106
4.10	Optimization algorithm parameters and optimized values for DC microgrid	109
4.11	Characteristics of fast subsystem of DC microgrid	110
4.12	System characteristics of original and reduced order DC microgrid	110
4.13	Specifications of components used in Typhoon schematic editor	114
5.1	Eigenvalues and participation analysis in autonomous AC microgrid	123
5.2	Effect of perturbation on slow modes	128
5.3	Eigenvalues and participation analysis in grid-tied AC microgrid	130

5.4	Eigenvalues of full order and reduced order DC Microgrid model	134
5.5	Eigenvalues of system matrix, A	136
6.1	IC circuit parameter values	156
6.2	Parameters of the PSO and ABC algorithm for robust controller tuning	157
6.3	Optimized parameters for PID, FOPID and $H_\infty$ Loop shaping controllers	159
6.4	Eigenvalues of open loop and closed loop system with $H_\infty$ controller	166