

Contents

1	RFID Antennas Systems Descriptions and Analysis	1
1.1	Active RFID TAGs System Analysis of Energy Consumption as Excitable Linear Bifurcation System	2
1.2	RFID TAG's Dimensional Parameters Optimization as Excitable Linear Bifurcation Systems.	14
1.3	RFID TAGs Coil's System Stability Optimization Under Delayed Electromagnetic Interferences	22
1.4	Semi-Passive RFID Tags with Double Loop Antennas Arranged as a Shifted Gate System for Stability Optimization Under Delayed Electromagnetic Interferences	44
1.5	RFID TAGs Detectors Stability Analysis Under Delayed Schottky Diode's Internal Elements in Time	72
1.6	RFID System Burst Switch Stability Analysis Under Delayed Internal Diode Circuitry Parasitic Effects in Time.	104
	Exercises.	144
2	Microwave Elements Description and Stability Analysis	155
2.1	Microstrip Transmission Lines Delayed in Time Power Limiters Stability Analysis	156
2.2	Three Ports Active Circulator's Reflection Type Phase Shifter (RTPS) Circuit Transmission Lines Delayed in Time System Stability Analysis	171
2.3	Cylindrical RF Network Antennas for Coupled Plasma Sources Copper Legs Delayed in Time System Stability Analysis	196
2.4	Tunnel Diode (TD) as a Microwave Oscillator System Cavity Parasitic Elements Stability Analysis.	221
	Exercises.	267

3 Microwave Semiconductor Amplifiers Analysis	279
3.1 Bipolar Transistor at Microwave Frequencies Description and Stability Analysis	279
3.2 Field Effect Transistor (FETs) at Microwave Frequencies Description	299
3.3 Field Effect Transistor (FETs) at Microwave Frequencies Stability Analysis	318
3.4 IMPATT Amplifier Stability Analysis	333
3.5 Multistage IMPATT Amplifier System Microstrip Delayed in Time Stability Switching Analysis	373
3.6 FET Combined Biasing and Matching Circuit Stability Analysis	382
Exercises	392
4 Small Signal (SS) Amplifiers and Matching Network Stability Analysis	405
4.1 Small Signal (SS) Amplifiers and Matching Network	406
4.2 Small Signal (SS) Amplifiers PI & T's Matching Network and Transformation	422
4.3 Small Signal (SS) Amplifiers Matching Network Stability Analysis Under Microstrip Parasitic Parameters Variation	435
4.4 Bias—T Three Port Network Stability Switching Under Delayed Micro Strip in Time	460
4.5 PIN Diode Stability Analysis Under Parameters Variation	489
Exercises	501
5 Power Amplifier (PA) System Stability Analysis	513
5.1 Class AB Push-Pull Power Amplifiers Stability Analysis Under Parameters Variation	514
5.2 Class C Power Amplifier (PA) with Parallel Resonance Circuit Stability Analysis Under Parameters Variation	528
5.3 Single Ended Class B Amplifier Gummel-Poon Model Analysis Under Parameters Variation	559
5.4 Wideband Low Noise Amplifier (LNA) with Negative Feedback Circuit Stability Analysis Under Circuit's Parameters Variation	573
Exercises	587
6 Microwave/RF Oscillator Systems Stability Analysis	601
6.1 A Resonator Circuit 180° Phase Shift from Its Input to Output Stability Analysis Under Delayed Variables in Time	602
6.2 Closed Loop Functioning Oscillator Stability Analysis Under Parameters Variations	617

6.3 Hartley Oscillator Stability Analysis	630
6.4 Colpitts Oscillator Stability Analysis	644
Exercises	661
7 Filters Systems Stability Analysis	673
7.1 BPF Diplexer Without a Series Input Stability Analysis	674
7.2 Dual Band Diplexer Filter Stability Analysis Under Parameters Variation	697
7.3 A Crystal-Lattice BPF Circuit Stability Analysis	711
7.4 A Tunable BPF Employing Varactor Diodes Stability Analysis	745
Exercises	768
8 Antennas System Stability Analysis	783
8.1 N-Turn Multilayer Circular Coil Antennas Transceiver System Stability Optimization Under Delayed Electromagnetic Interferences	785
8.2 Double Rectangular Spiral Coils Antennas System Stability Optimization Under Delayed Electromagnetic Interferences and Parasitic Effects	818
8.3 Single-Turn Square Planar Straight Thin Film Inductors Antenna System Stability Optimization Under Microstrip Delayed in Time	849
8.4 Helix Antennas System Stability Analysis Under Parameters Variation	873
Exercises	885
9 Microwave RF Antennas and Circuits Bifurcation Behavior, Investigation, Comparison and Conclusion	903
Appendix A: RFID LF TAG 125 kHz/134 kHz Design and Analysis	913
Appendix B: RF Amplifiers Basic and Advance Topics and Design Methods	941
Appendix C: BJT Transistor Ebers-Moll Model and MOSFET Model	993
References	1035
Index	1041