

# ECEN620 HW3

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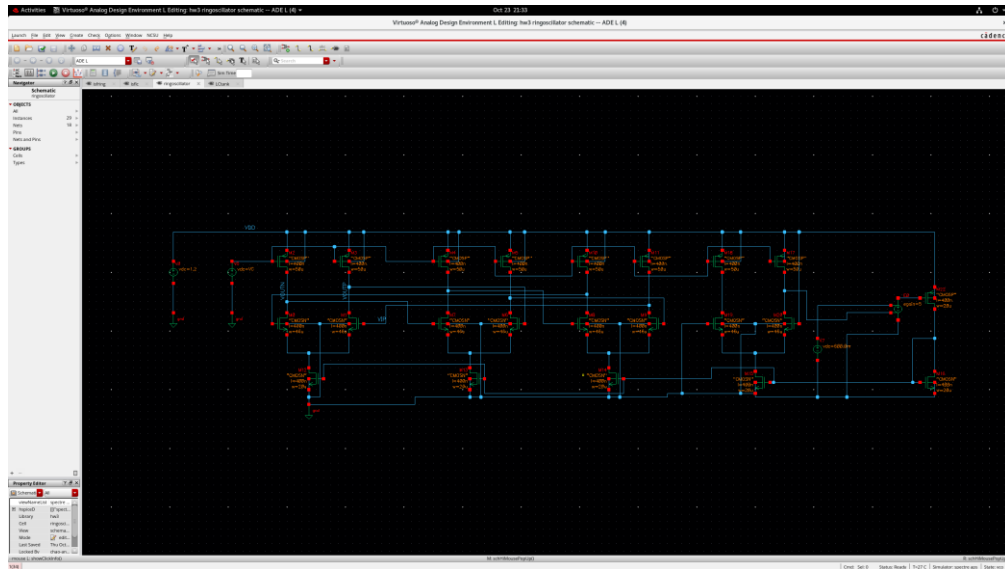


Figure 1 Ring Oscillator Schematic

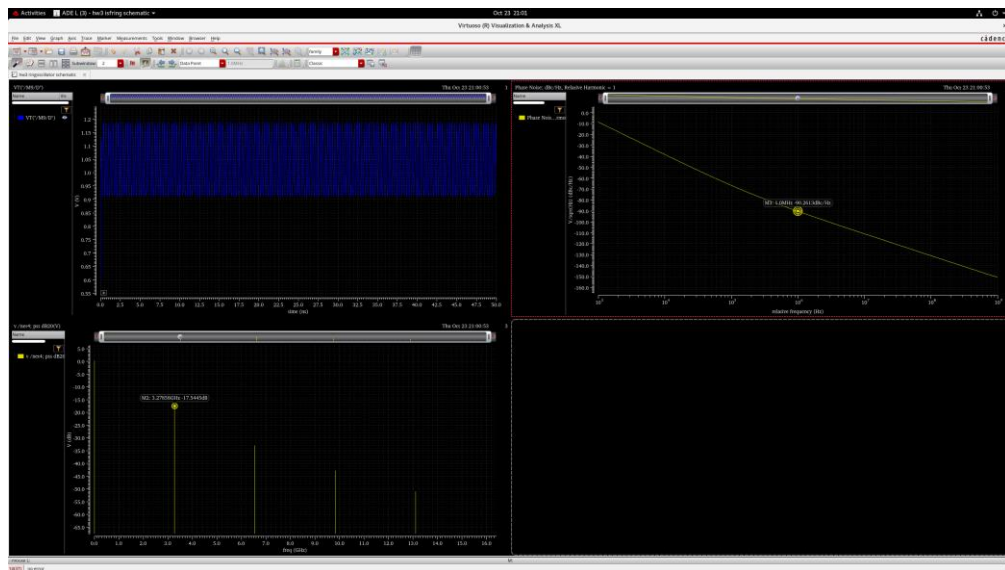


Figure 2 Ring Oscillator Simulation Results

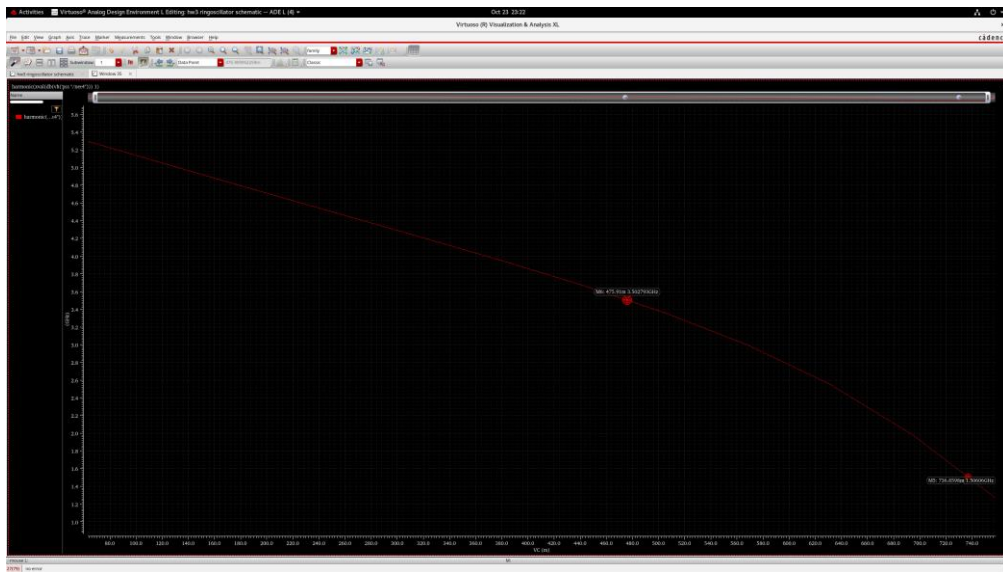


Figure 3 Ring Oscillator Tuning Range

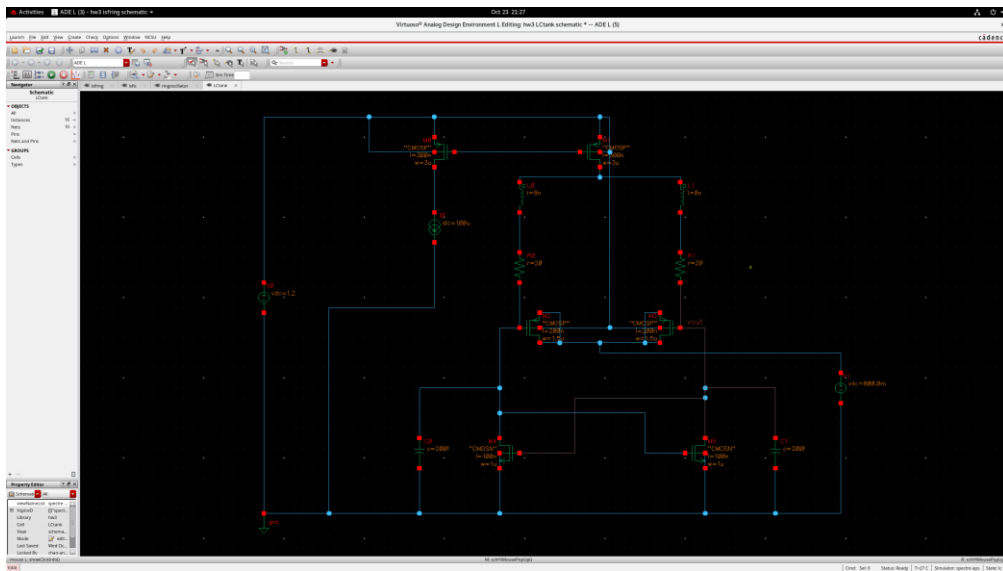


Figure 4 LC Tank Oscillator Schematic



Figure 5 LC Tank Oscillator Simulation Results

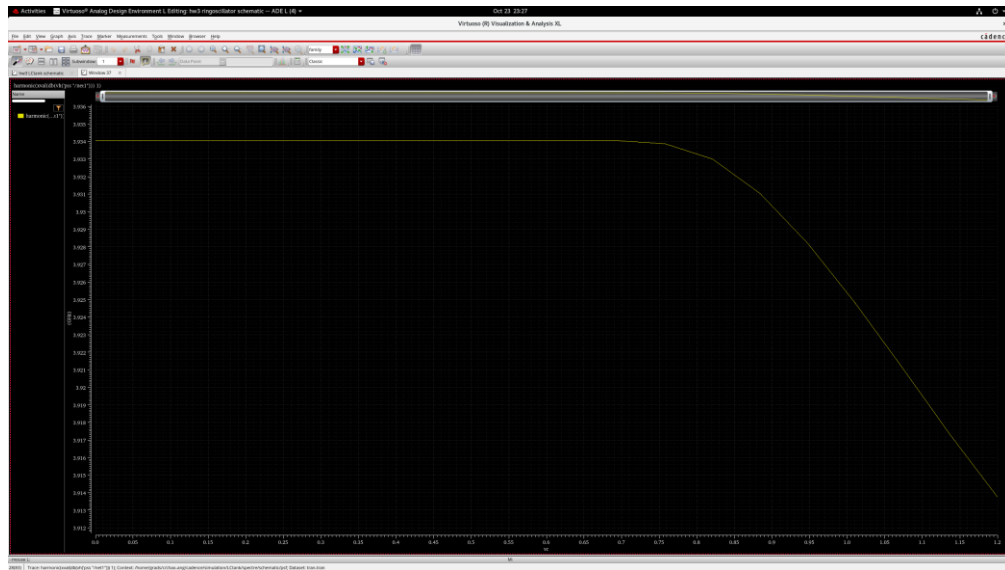


Figure 6 LC Tank Oscillator Tuning Range

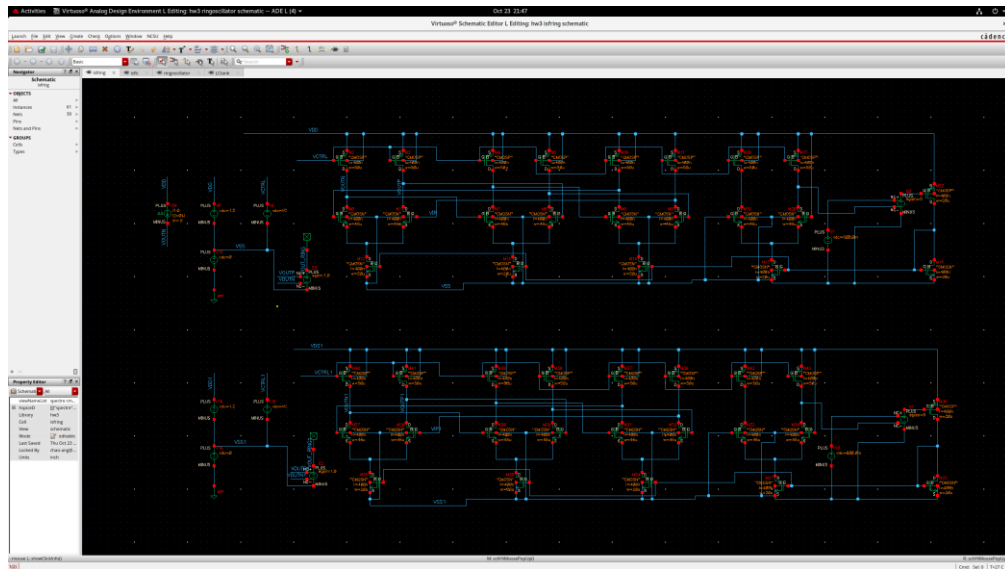


Figure 7 Ring Oscillator ISF Simulation Schematic

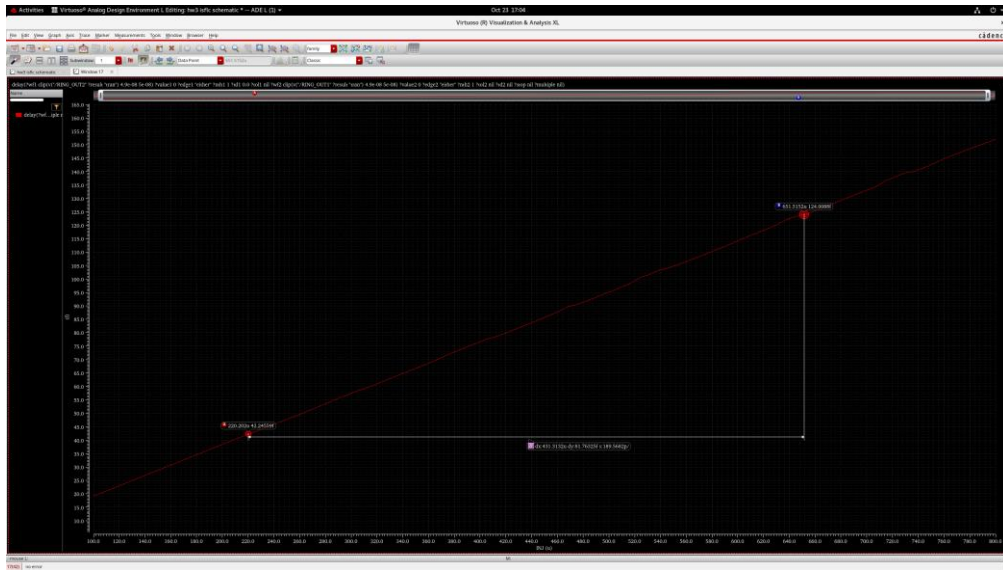


Figure 8 Ring Oscillator Injection Linearity Simulation

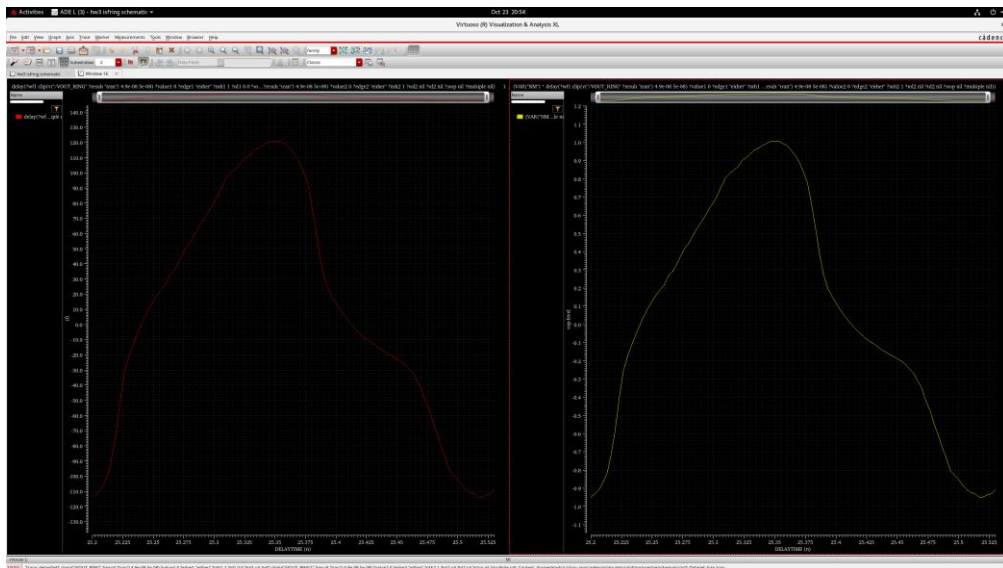


Figure 9 Ring Oscillator ISF Normalize and Compare

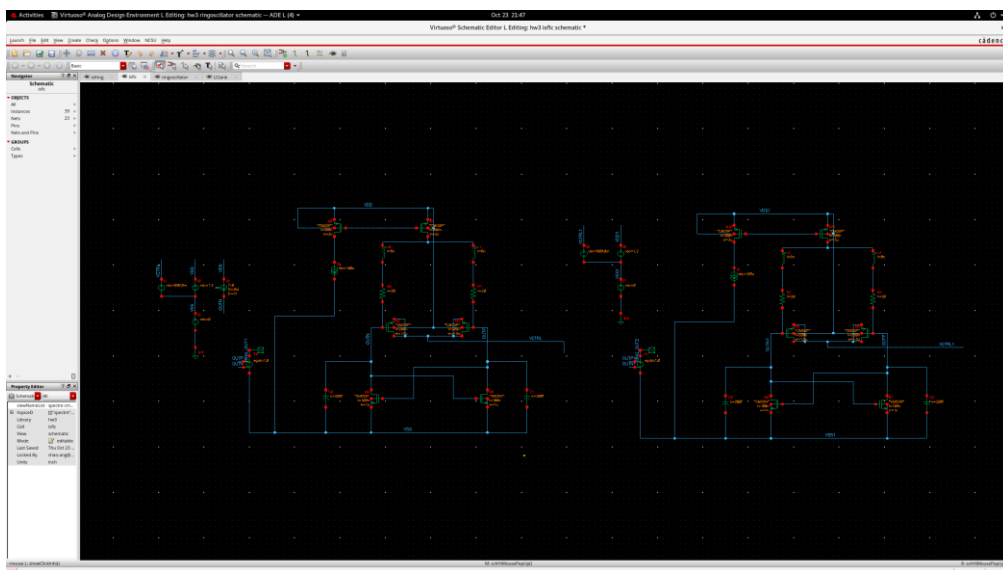


Figure 10 LC Tank Oscillator ISF Simulation Schematic



Figure 11 LC Tank Oscillator Injection Linearity Simulation

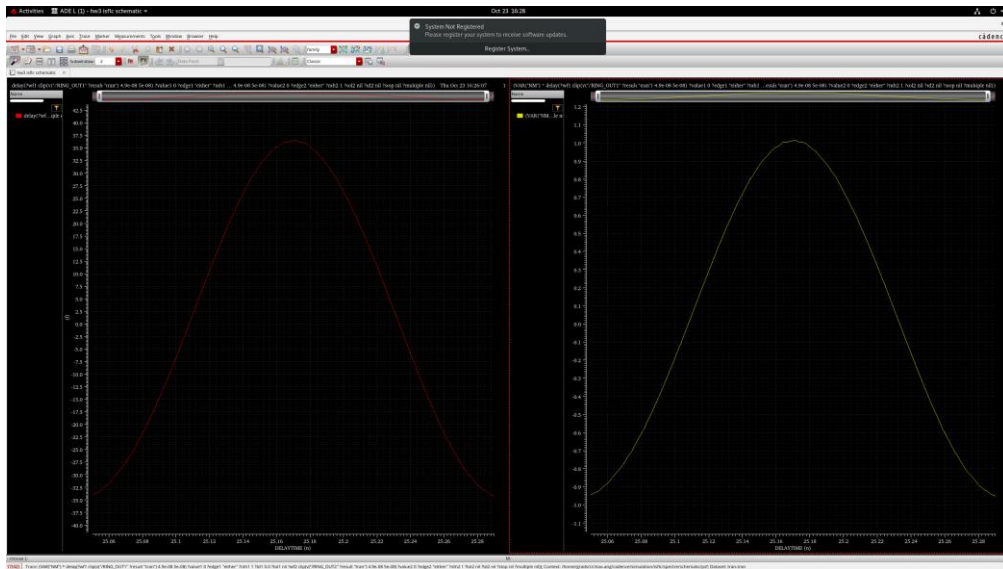


Figure 12 LC Tank Oscillator ISF Normalize and Compare





Figure 13 Divider Schematic

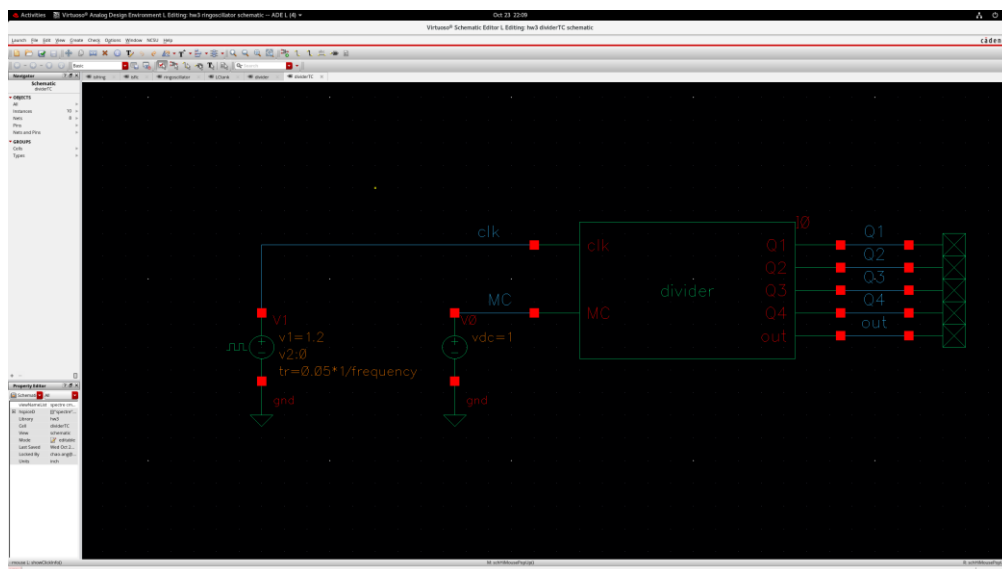


Figure 14 Divider Test Bench

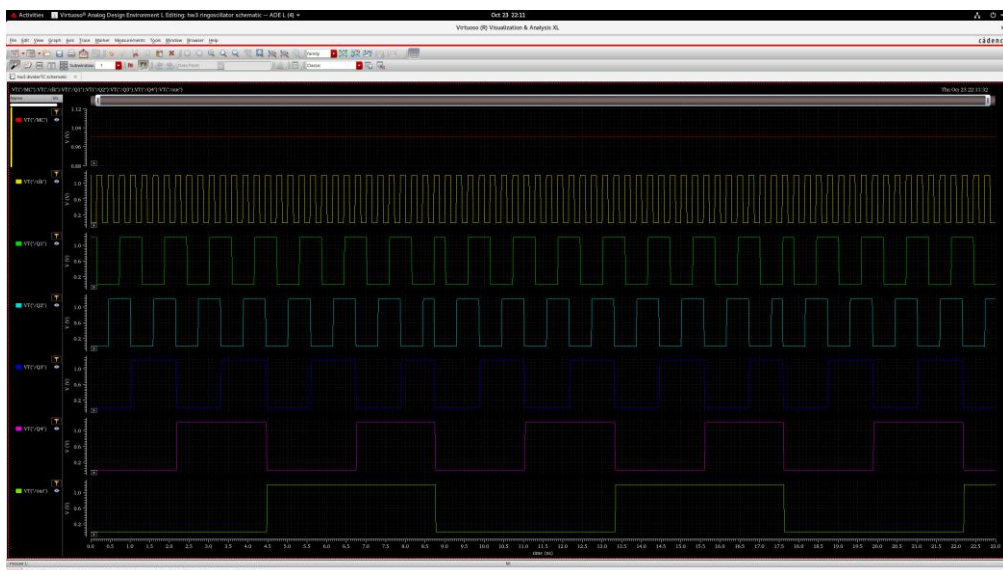


Figure 15 Divide by 32 Simulation Result

8	frequency(VT("/clk"))	3.5G	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
9	frequency(VT("/Q1"))	898.6M	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
10	frequency(VT("/Q2"))	897.4M	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
11	frequency(VT("/Q3"))	450M	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
12	frequency(VT("/Q4"))	225.8M	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
13	frequency(VT("/out"))	112.9M	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Figure 16 Divide by 32 Frequency

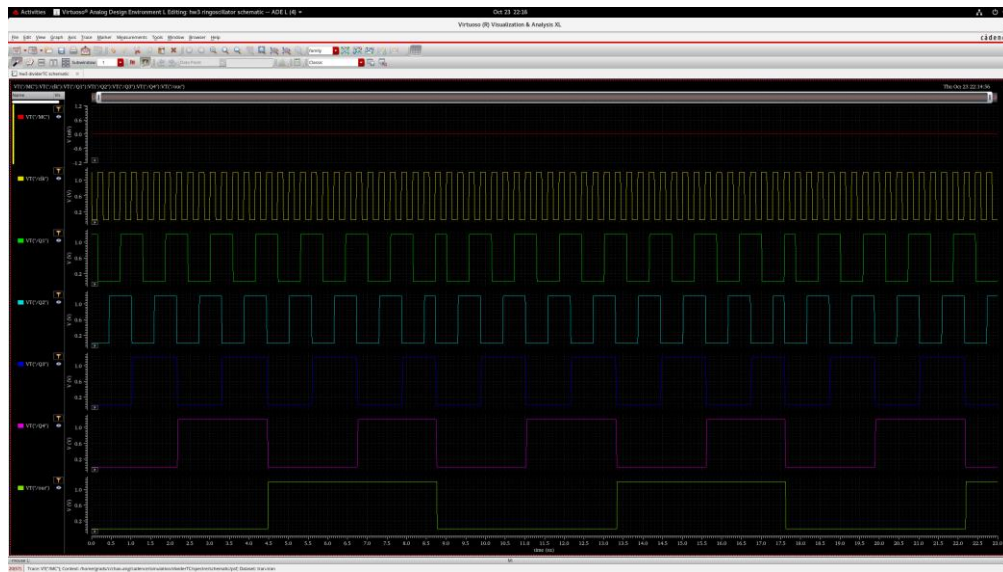


Figure 17 Divide by 31 Simulation Result

8	frequency(VT("/clk"))	3.5G	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
9	frequency(VT("/Q1"))	898.6M	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
10	frequency(VT("/Q2"))	897.4M	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
11	frequency(VT("/Q3"))	450M	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
12	frequency(VT("/Q4"))	225.8M	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
13	frequency(VT("/out"))	112.9M	<input checked="" type="checkbox"/>	<input type="checkbox"/>	

Figure 18 Divide by 31 Frequency

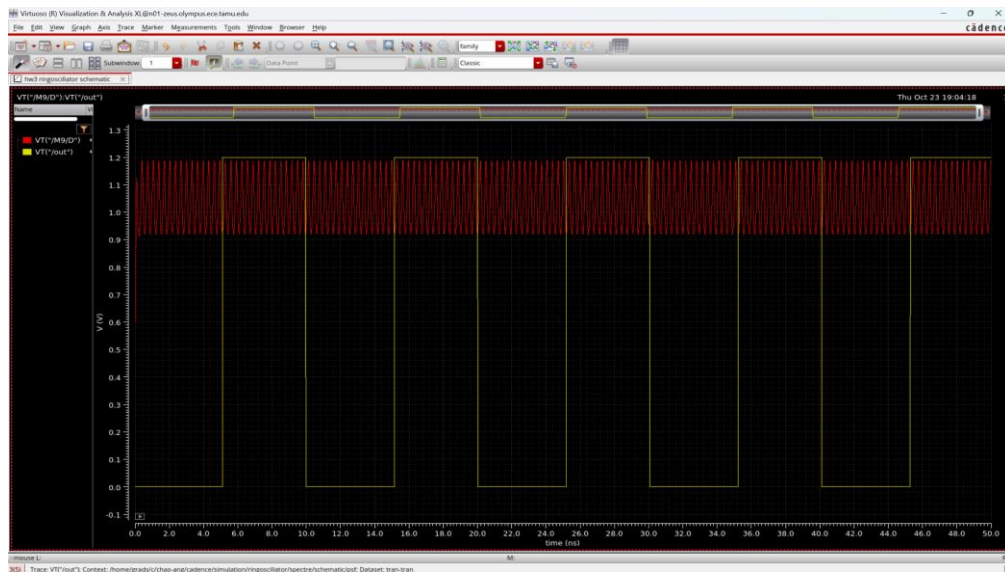


Figure 19 Ring Oscillator with Divider

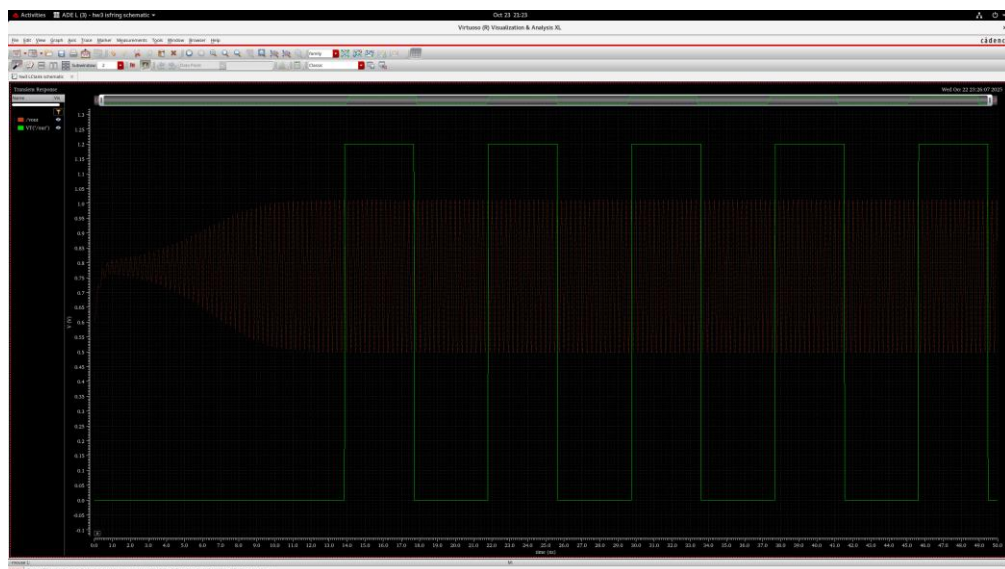


Figure 20 LC Tank Oscillator with Divider