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LABORATORY REPORT

INTEGRAL AND DIFFERENTIATING CIRCUIT

INTRODUCTORY SUMMARY

Last week we do the 5th experiment in circuit lab. The laboratory is about integral and differentiating circuit and the aim of the experience are

1. Learn to use operational amplifier composing integral differentiating circuit.
2. Grasp the characteristic and the performance of the integral differentiating circuit.

After do the experiment I check the data and summery the conclusion and finally finish this report.

LAB EQUIPMENT

- Digital multitester
- DC stabilized voltage power supply
- Function signal generating device
- AC millivolt
- Double-trace oscilloscope

LAB PROCEDURE

This laboratory contains three parts including integral circuit, differentiating circuit and integral-differentiating circuit.

1. Integral circuit

Experimental circuit is as shown in Figure 1. Analyze Figure 1 circuit, think if the input is sine wave, how many uo and ui phase difference are. And when the input signal is 100HZ, RMS value is 2V, count the outputs uo.

1.1 Taking ui=-1V, separate switch K (switch K replaces with a wire, draws out a wire-port as switch) and observe uo changes with the oscilloscope.

1.2 Measure the saturated output voltage and the effective integral time.

1.3 Cause Figure 1 integral capacity to change 0.1 uF, separate K, ui respectively inputs the 100HZ, amplitude value is the 2V square-wave and the sine wave signal, observe ui and uo value and the phase relation, and record the waveform.

1.4 Change Figure 1 circuit's frequency and observe the relations of ui and uo phase and amplitude value.

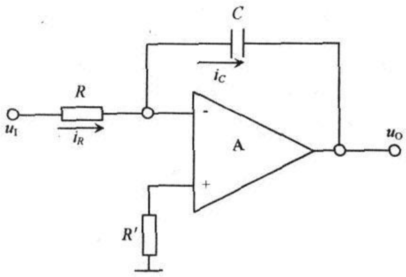

Figure 1

2. Differentiating circuit

Experimental circuit is as shown in Figure 2. Analyze Figure 2 circuit, think if the input is square wave, how many uo and ui phase difference are. And when the input signal is 160HZ, amplitude value is 1V, count the outputs uo.

2.1 The input is sine wave signal f=160 HZ and RMS value as 1 V, observe ui and uo phase , amplitude value change with the oscilloscope, and record these waveforms.

2.2 Change sine wave frequency(20~400 Hz) , observe ui and uo phase and amplitude value change with the oscilloscope, and record these waveforms.

2.3 The input is square wave signal, f=200 Hz, ui=5 V or-5 V, observe ui and uo waveform with the oscilloscope, repeatedly do the above experiment.

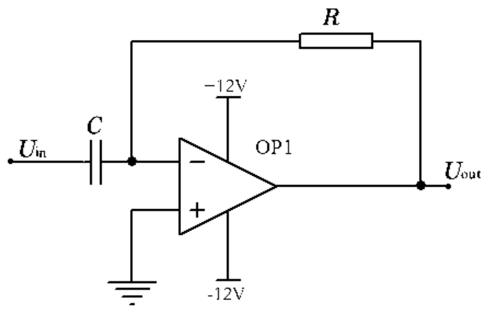

Figure 2

3. Integral-differential circuit

Experimental circuit is as shown in Figure 3.

3.1 ui input f=200 Hz, U=6 V or -6 V square signal, observe ui and uo waveform with the oscilloscope, and record these waveforms.

3.2 Change f=500 Hz and repeatedly do the above experiment.

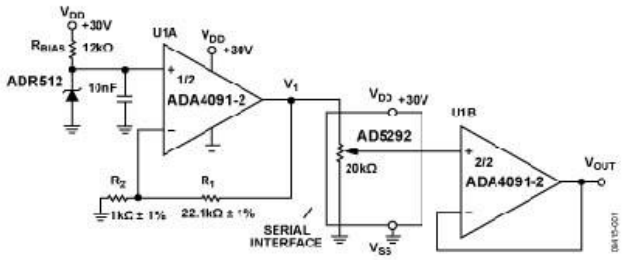

Figure 3

CONCLUSION

From this laboratory I have the conclusion.

1. The integration circuit may be a square wave input is converted into a triangular wave or a time constant of the integrating circuit the ramp.
2. The resistors connected in series in the main circuit, the capacitor trunk.
3. differential circuit allows the input square wave is converted into a sharp pulse wave .
4. The differential circuit capacitors in series in the main circuit, the resistance in the trunk of the time constant of the differentiating circuit.
5. The differential circuit input and output into a differential relationship.

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