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RC sine wave oscillating circuit

I. Experiment purpose

1. Grasp RC sine wave oscillating circuit's constitution and the principle of work.
2. Familiar sine wave oscillating circuit's adjustment and measurement method.
3. Observe RC parameter to the oscillation frequency influence, research oscillation frequency measurement method.

II. Experiment equipment

1. Digital multimeter
2. DC stabilized voltage power supply
3. Function signal generating device
4. AC millivolt
5. Double-trace oscilloscope

III. Preparation requirement

1. Review RC bridge-type oscillating circuit's principle of work.
2. If the oscillator output waveform presents the high and low clipping, how should adjustment circuit do?
3. Complete the following topics
 - (1) In Figure (a), the positive feedback branch is composed of (RC series parallel), this network has (Frequency selection) the characteristic, if we must change the oscillation frequency, as long as changes (R) or (C) value then.
 - (2) In Figure (a), R_{p1} and R_{p2} compose (negative) feedback, one of both (R_p) uses for adjusting amplifier's gain, causes $A_u \geq 3$.

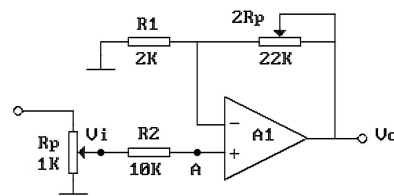
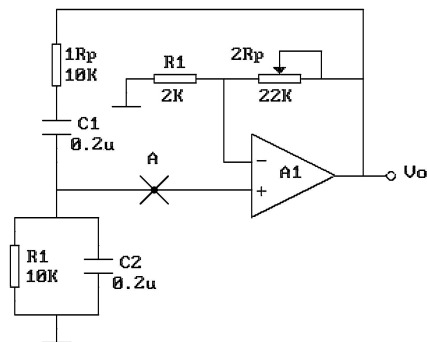
IV. Experiment content

1. According to Figure (a) connect circuit, observe the output waveform with the oscilloscope
 - (1) If the part is good, the wiring is correct, the supply voltage is normal, but $u_0=0$, why? How to process?
 - (2) Oscilloscope has some outputs but presents the obvious distortion, how to solve?
2. Measure the output frequency of the circuit with the frequency meter, if there is not the frequency meter to be used, according to the Figure (b) wiring, with Li Shayu the graph law measurement, determine u_0 frequency f_0 and compare with the calculation value.
3. Adjustment oscillation frequency
Select electric bridge capacity $C_1=C_2=0.1 \mu F$, after the suitable adjustment R_{p2} , cause

U_0 not obvious distortion, measure the frequency.

4. Determination OP amplifier circuit's closed loop voltage amplification gain A_{uf}

Determine Figure (a) circuit's output voltage u_0 first, then cut off power supply, maintain R_{p2} and signal generating device frequency which is invariable, separate Figure (a) A spot and connect the low-frequency signal generator's output voltage to a $1k\Omega$ potentiometer, then from this $1k\Omega$ potentiometer's slip connection spot take u_i connection to OP in phase input-port. As shown in Figure (b), adjusts u_i and causes u_0 to be equal to the original value, determine this time's u value, and then $A_{uf}=u_0/u_i=(3.12)$.



5. Measure the RC series and parallel circuit's amplitude frequency characteristic

(1) Select $R=1k\Omega$, $C=0.1\mu F$, adjust signal frequency and maintain input $u_i=3V$ invariably. Measure output voltage, and the measurement data is not less than.

(2) Select $R=200$, $C=2.2F$. Repeat the above measurement curve.

V. Conclusion

Through the experiment, I learned a RC bridge sine wave oscillator circuit working principle and circuit structure which is composed of integrated operational amplifier. I know RC bridge oscillator in RC series parallel frequency selective properties, do familiar with the commonly used instruments and understand the basic method of circuit debugging further hands with dual trace oscilloscope to measure the phase difference method. At the same time I learned Visio drawing software and Multisim circuit simulation software.

I will call you this week to discuss our study and any possible followup you may wish us to do.

Sincerely,

Jinyu Zheng
Student