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LABORATORY REPORT
Transistor Common-Emitter Single-Tube Amplifier Circuit

INTRODUCTORY SUMMARY

Last week we have studied the amplifier and attached importance on "Common-Emitter" amplifier. You sent us a file which involved the question and request about the lab of this amplifier. Having analyzed it in our lab, we thoroughly understand its principle and properties and how to use it. As you request, this report will give a summary of the materials and procedures we used in this project, along with analysis we had about the results.

Our purpose in this kind of lab is to:

a) Grasp the measuring method of the amplifying circuit static working point and analyze the influence of the static state working point to the amplifier performance.
b) Grasp the measuring method of amplifying circuit input resistance and the output impedance.

LAB METERIALS

Our lab analysis relies on equipment: digital multitestr, Function signal generating device, AC millivolt, Double-traces oscilloscope. Besides them, we use DC stabilized voltage power supply to supply the power to the transistor amplifier.

LAB PROCEDURE

Step 1

We use multitister to judge the triode's polarity and quality. Then according to the Figure 9.1 junction circuit to, connect direct-current power supply, measure VB,VE,VC,RP with multitister, and calculate UCE, IB,IC.

Step 2

a) According to Figure 9.2 junction circuit, ajust RP to cause Vc to be equal to 6v.
b) Ajust signal generator's output for the simusoidal signal of f=1kHZ, Us=500mv, and connect to the Figure 9.2 electric circuit's A spot, through R1, R2 attenuation 100 times, the signal which the Ui obtain 5mv, and observe Ui, Uo signal, pay attention to phase relation, and draw Ui, Uo waveforms.

c) Maintain the signal generating device output signal frequency invariable increase the signal scope gradually, observe the most greatly, most distorted voltage Uo and fill the table.
d) Maintain Ui=5mv to be invariable, when idling tune Vc=6v, and the load is connected to the amplifying circuit, according to parameter condition table which assign measurement, and complete result.
e) Ui=5v, reduce Rp, cause Vc<4v, may observe (Uo waveform) the saturated distortion, increase Rp, cause Vc>9v, RL is changed from 5.1 to 510, may observe (Uo waveform) to cutoff distorts, write down the measurement results.

Step 3

Add output-port an adjustable resistance as a load, choose the appropriate RL value to cause the amplifying circuit to output not distored (access oscilloscope surveillance), measure output voltage UL (loading) and output voltage Uo, then figure out Ro and write down the results.

RESULTS ANALYSIS

a) When with no-load in circuit, there are large errors between the value of the actual calculation and estimated results. This is owing to the errors of the resistance and rheostant, inaccurate readings and so on. Compared with theoretical values, the errors of the input resistance, output resistance is relatively small. So these experimental errors are reasonable.
b) Whether the static state working point is appropriate or not has much effect on the performance of the amplifier and output waveforms. If working point be high, the saturated distortion is easy to be produced after joining AC signal amplifier, the negative half cycle of Uo will be flat. If the working point be low, the cutoff distortion is easy to produce, the positive half cycle of Uo will be flat.

CONCLUSION

This experiment about the transistor common-emitter has involved much knowledge. It clearly illustrated the principle and properties of static state working point. And It also attracted students' attention and interest of it. By completing it by myself, I've learned much about it. I understand more about the static state working point, voltage amplifying gain, different waveforms. I expect the other experiment in future study.

I am really expect that I can do experiment in the lab again. Hoping you can take it into consideration.

Sincerely,
Qian Huang