Lab 3 Manual

1 Objectives

Understand feedback control.

2 What to Bring

Each group should bring a USB storage device to store the screen image.

3 Open Loop Control—Plant

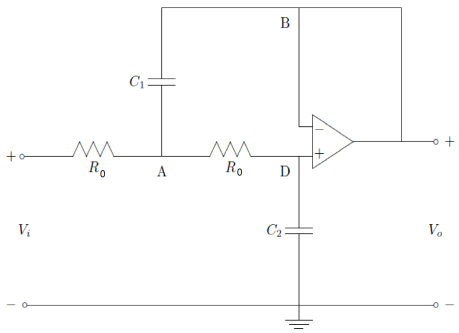

Figure 1: Plant Circuit

Steps:

1. Construct the plant circuit according to Figure 1. Where $R_0 = 10k\Omega$, $C_1 = 100\mu F$, $C_2 = 0.22\mu F$.
2. Impulse response: A=1V, width=0.1s, f=1Hz. (1 Picture)
3. Step Response: A=1V, f=1Hz.(1 Picture)

For example, for the step response, you should try to get something like the waveform shown in following figure.

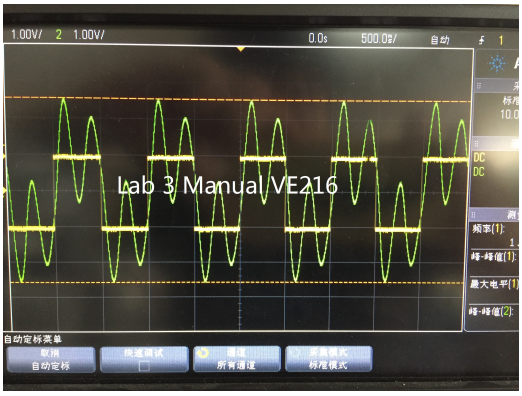

Figure 2: Plant Result

Note 1: Do not destroy your plant circuit after you get the image, you are going to use it in the next part.

Note 2: Do not forget to supply all the op-amps with DC voltage(Pin 4(-12V) and 7(12V))
Note 3: If a capacitor is labeled"474", its capacitance is 47×10^4 pF; "224" is 22×10^4 pF

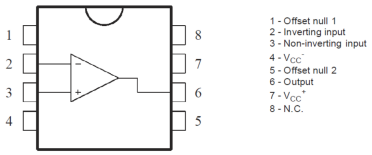

Figure 3: Op-amp

4 Feedback Control

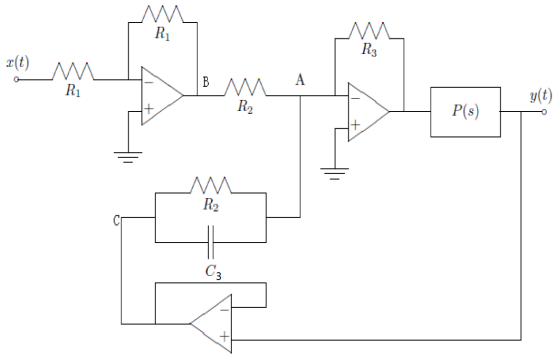

Figure 4: Feedback Control Circuit

Steps:

1. Add the feedback control circuit to the plant according to Figure 3. Where $R_1 = R_3 = 150k\Omega$, $R_2 = 3k\Omega$, $C_3 = 0.47\mu F$.
2. Impulse response: A=1V, width=0.1s, f=1Hz. (1 Picture)
3. Step Response: A=1V, f=1Hz.(1 Picture)

For example, for step response, you should try to get something like the waveform shown in the following figure.

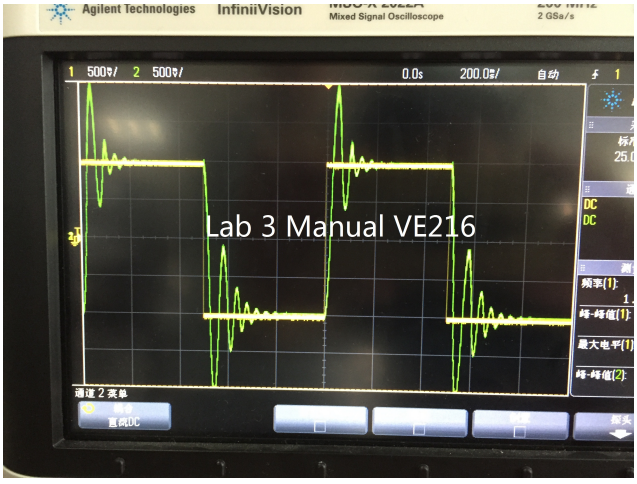

Figure 5: Feedback Control Result

5 Deliverables

You should submit a post-lab report containing the following:

1. Experimental results(numerical results, figures).
2. Error analysis, and discussion.
3. Conclusions