Watt Balance LabView Program
3H03

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1   Watt Balance Program

The LabView program that controls the Watt balance can be a bit daunting. This document contains a handful of screenshots with some explanations that should make the experiment a little easier to start using.

The program is shown in Figure 1. There are four tabs at the top of the program, but only the first three are sueful. The first tab, 'Graphs', allows the user to see the change in a given variable over time. I suggest having the balance posisiton and current in coils open at all times. Look to these graphs to make sure the Watt balance is doing the things you expected it to.

The next tab over is 'Measurements'. Click on the Boolean switches in this tab to open up the shadow sensor calibration, or to measure BL, h, or a mass. Note that, when measuring BL (Figure 2), you will likely need to open 'Velocity Mode' from the 'Settings' tab to control the amplitude and frequency of the sinusoidal current. Users typically find success with about 800 mV amplitude and 500 mHz frequency, but your experience may differ. Make sure the coils can move smoothly over the magnet stand. Friction can make this measurement exceedingly difficult.

Finally, there is the 'Settings' tab, as shown in Figure 3. The boolean switches for 'Velocity mode' and 'Zeroposition' will likely be the most useful for you. Set both polarities to 'negative'. Have a look at the value for 'g', and change it to be precisely the value for your location. If the Watt Balance is taking more than 5 minutes to settle to a given current/balance position, then check to make sure the coils aren't rubbing against the magnet stand. In the worst case, you may need to change the PID settings. Ask your TA about PID controllers if you're uncertain about how they work. Lastly, please DO NOT hit the 'Factory reset' button. Hitting that button results in a drastic change to the calibration settings, and it may take a long time to get the Watt balance working again.
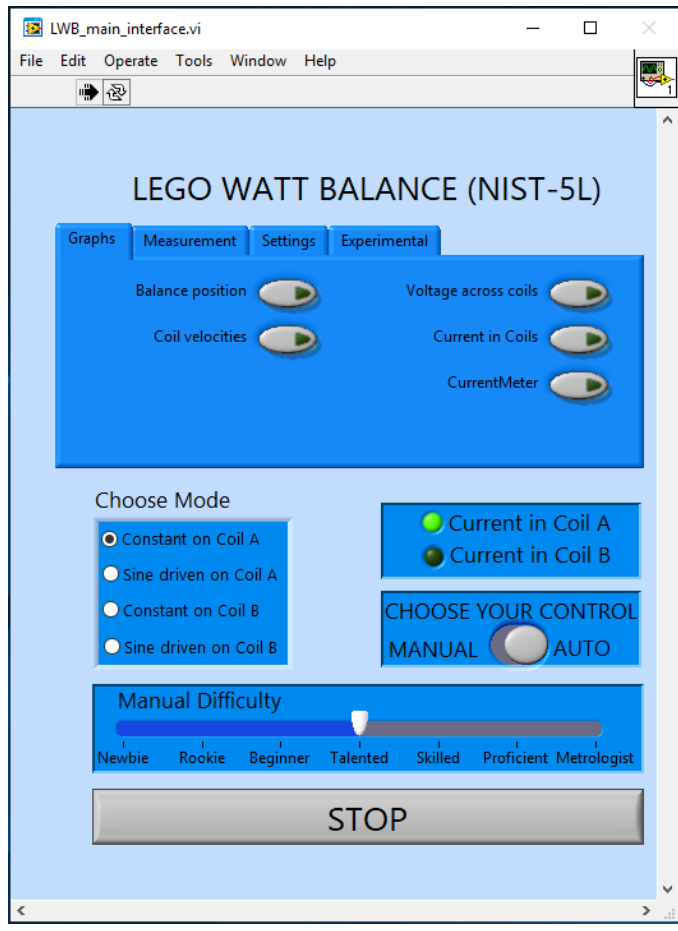
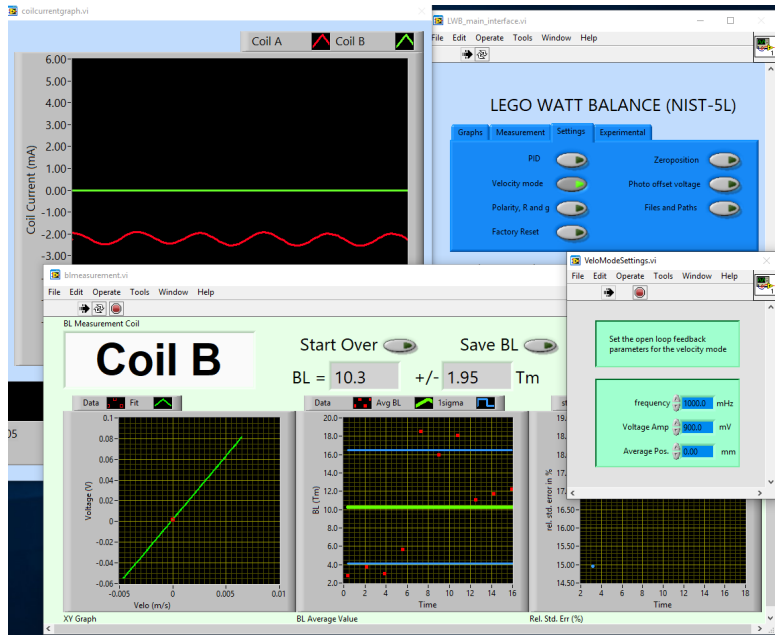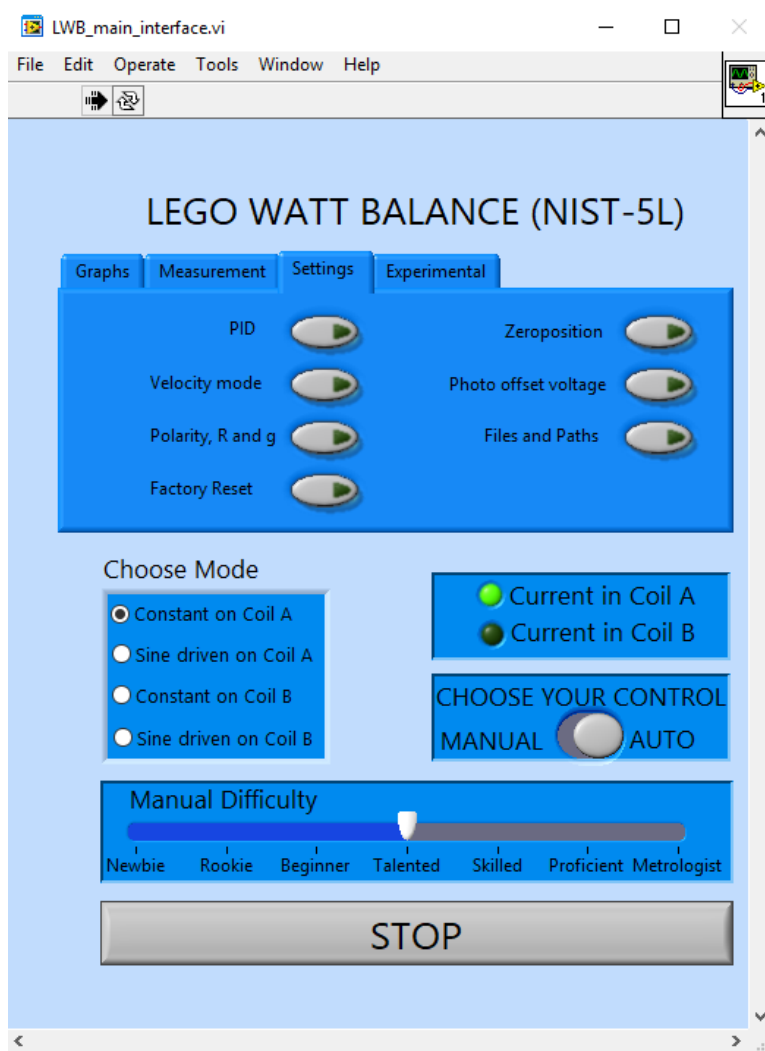Figure 1: LabView program to run the Watt Balance.

Figure 2: Program to measure BL.

Figure 3: Settings options for the Watt balance program.