

Procedure Replacement for the “pend_collect” function

On page 7 where it says “>>[acttime,actth1,a,b,c,d]=pend_collect(zeros(1000,1));” replace with the following procedure:

1. At the Matlab command prompt type “pend_collect” and press enter. A Simulink block diagram should load. Note: the first time you launch a Simulink file it takes 10 seconds or so.
2. In order to use this Simulink file you will need to save it to a directory in the C:\matlab\me340 directory. For example save it as c:\matlab\me340\mycollect.mdl. If mycollect.mdl already exists just save over the top of it.
3. At the Matlab command prompt change the current directory to the c:\matlab\me340 directory by typing “cd c:\matlab\me340.”
4. Looking at the Simulink block diagram you will see that zero volts is being sent to the DAC output and optical encoder channel one’s data is being collected. Real-Time Windows Target has been setup to sample data every 5 ms., so our sample period is 5 ms.
5. Real-Time Windows Target is reading the encoder attached to the shoulder joint of the double pendulum. This encoder has a resolution of 5000 cnts/rev. With that information you can see that the gain block in the Simulink diagram is converting encoder counts to angle in radians.
6. Now you will build and run this Simulink file. From inside your Simulink file select the menu item Code->C/C++ Code->Deploy to Hardware. This will build your Simulink file into a Real-Time Windows Target application. The build takes about 10-20 seconds. Once complete the Play button will turn back to green.
7. When you are ready to collect data simply click the play button. After about 5 seconds your application will start and you will see data plotting in the scope window. Now move the first linkage to the initial condition you desire. Make sure the second link is vertical and not moving and then release the linkage. Collect about 5 seconds worth of data and then click the stop simulation button.
8. By default the data is save in the Matlab variables “acttime” and “actth1.”