

EE442/EE592 Real-Time Digital Signal Processing

Laboratory 5: TI-Based FIR Filter Implementation

1 Obtaining and Building the FIR Filter Code

- 1) Download the FIR LPF zip file from the course website (TI 6416 Code tab). Extract the files and save them in C:\Documents and Settings\dspguest\Desktop.
- 2) Launch CCStudio 3 and go to “Project” menu. Choose “Open...” option from this menu.
- 3) Open “dsk_app.pjt” from folder C:\Documents and Settings\dspguest\Desktop\TI_6416DSK_LPF.
- 4) Click on the “+” sign which is to the left side of “dsk_app.pjt (Debug)”. It displays the files which are included in “dsk_app” project.
- 5) The file “user_data.h” has the all necessary declarations (global variables) and includes util.h inside the folder “DSPFunctionsFixedPoint”. Once the project has been built all functions inside “DSPFunctionsFixedPoint” will automatically be added to the project.
- 6) “util.h” contains the necessary function prototypes.
- 7) FIR filter code is written inside cfir.c and called by process_signal.c.
- 8) The filter coefficients are defined in initialize_program.c.
- 9) Any new functions can be added to the existing project by including a prototype of the function in “util.h” and creating a C file with the appropriate code inside the “DSPFunctionsFixedPoint” folder.
- 10) Go to the Debug menu and choose “Connect” to connect to the target DSP board.
- 11) Go to the Project menu and choose “Build” to build the application (compile).
- 12) Go to the File menu and choose “Load program.” Select dsk_app.out found in the Debug folder.
- 13) Go to the Debug menu and choose “Run.”

2 Testing the FIR Filter Code

- 1) The best way to test the proper functioning of the FIR Filter is by the means of a function generator and an oscilloscope. *The following steps are only to be done under the supervisor of the instructor or TA.*
- 2) Connect the “Line_IN” cable to the function generator. Set the amplitude of a sine wave to 0.25 Vpp (Caution: Using the oscilloscope, make sure the amplitude does not exceed 1 Vpp before the connection is made to “Line_IN”)
- 3) Connect the “Line_Out” cable to the oscilloscope.
- 4) Notice the cut-off frequency of the FIR Filter using the oscilloscope. As you increase the frequency above 2.4 Khz, the amplitude of the filtered signal significantly reduces.

Please notify pdeleon@nmsu.edu regarding corrections or improvements to this lab.