

Lab 3 : Wavelet Denoising

September, 2006

1 Overview

This experiment uses wavelets to remove noise from a noisy signal. It is not recommended that one try to build this model from scratch. It uses complicated subsystems for the Delay Alignment block and the Soft Threshold block. It would be easier for one to work with the completed model. The figure below shows the block diagram for this model.

2 Software overview

In this lab, Simulink is used to model the system.

3 Initial configuration

This section is the same as section 3 in Lab 2.

3.1 Check if CCS is properly installed

To verify that CCS is properly installed on the system, enter

```
ccsboardinfo
```

at the Matlab command line. Matlab should return information similar to the following listing:

Board Num	Board Name	Proc Num	Processor Name	Processor Type
0	C6713 DSK	0	CPU_1	TMS320C6x1x

To ensure Embedded Target for TI C6000 DSP is installed, enter

```
c6000lib
```

Matlab should display the C6000 block library containing the libraries: C6000 DSP Core Support, C62x DSP Library, C64x DSP Library, C6416 DSK Board Support, C6701 EVM Board Support, C6711 DSK Board Support, C6713 DSK Board Support, RTDX Instrumentation, TMDX326040 Daughtercard Support.

3.2 Configuration Parameters for C6000 Hardware

1. Launch Matlab
2. At the Matlab command line, type

```
simulink
```


to launch Simulink
3. Create a new model in Simulink.
4. To open the **Configuration Parameters**, select **Simulation**→**Configuration Parameters**
5. In the **Select** tree, chose the **Real-Time Workshop** category.
6. For **Target Selection**, choose the file ti_c6000.tlc. Real-Time Workshop will automatically change the **Make command** and **Template makefile** selections.
7. Choose the **Optimization** category in the **Select** tree. For **Simulation and Code generation**, un-select **Block reduction optimization** and **Implement logic signals....**
8. Choose the **TI C6000 target sel....** Set **Code generation target type** to C6713DSK.
9. Choose the **TI C6000 compiler**. Set **Symbolic debugging**.
10. In the **Select** tree, choose the **Debug** category. Select **Verbose build** here.
11. In the **Select** tree, choose the **Solver** category. Ensure that Solver is set to Fixed type / discrete.

4 Building the Wavelet Denoising system

The block diagram that implements this system is shown in the figure. It is often useful to create a separate directory for each model. This lab assumes that the model is called wavedenrtw.mdl

1. • From the Matlab command line, type:

```
!mkdir c:\wavdenrtw
```

- Make wavdenrtw your working directory in MATLAB:

```
cd c:/wavden
```
- Open the wavdenrtw.mdl (provided).
- The model appears in the Simulink window.
- From the File menu, choose Save As. Save a copy of the wavdenrtw model as c:/wavdenrtw/wavdenrtwmyname.mdl. During code generation, Real-Time Workshop creates a build directory within the working directory. The build directory name is derived from the name of your the model and the chosen target. In the build directory, Real-Time Workshop stores generated source code and other files created during the build process.

2. Connect a microphone to the Mic In connector of the C6713 DSK and connect speakers to the Line Out connector of the DSK.
3. Build and execute the model using the Incremental Build button on the toolbar.
4. You should hear the de-noised output from the speakers.
5. Change the threshold for different levels of de-noising.

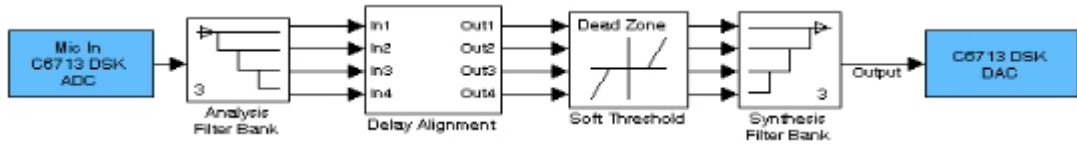


Figure 1: Wavelet De-noising