

ELEC/TELE/PHTN 4123

Signal Processing Topic

Introduction

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Overview of the Tasks

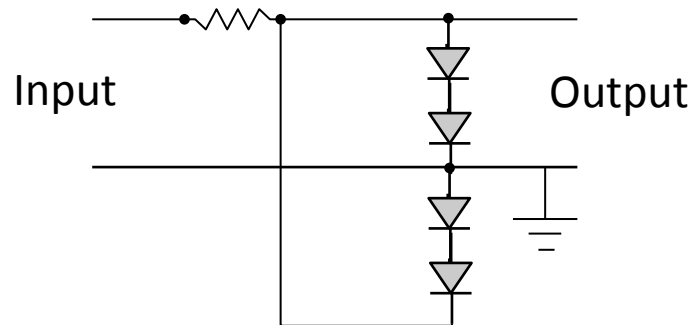
- Analog filtering
- Sampling and aliasing
- Digital filtering
- Ultimate goal:
 - sound source localization via microphone pair

Interfacing the Computer

- We will need this for both the Signal Processing and Control tasks
- The simplest approach is to work with the computer's sound card, using Matlab
- Another alternative is to use the National Instruments NI-6009 DAQ device
 - USB connected
 - A/D: 13-14 bits at 48kHz mux over 1-8 channels
 - D/A: two independent channels
 - Digital I/O: 12 channels

Working with the Sound Card

- Main concern: protecting computer from harm
- Max signal is nominally 1V p-p
- The lab has protection break-out boxes
 - you need also to be able to make your own
 - valuable if you want to try things out with your own computer, at home or in the lab.



Working with the NI-6009 DAQ

- Can be controlled via Matlab
 - However, this is not the original intent
 - National Instruments advocates LabView or C/C++/C#
 - Problems can arise with 32-/64-bit Matlab support
- Direct interface via C/C++/.NET (C#/VB)
 - Download recent version of NI-DAQmx
 - Works best with Windows (see more below)
 - Lab computers have Visual Studio for Windows
 - Can also bring your own laptop

NI-6009 More Information

- Install NI-DAQmx or NI-DAQmx_base
- Plug in device
- List devices (lsdaq application)
 - update firmware if instructed to do so
- Build and try out the examples
- Non-Windows platforms?
 - NI-DAQmx is only available for Windows
 - provides highest level of functionality and support for different programming environments
 - NI-DAQmx_base works on Mac and Linux
 - does not appear to provide multi-threaded/asynchronous access
 - this could be a show-stopper if you need real-time input and output

Procedural Matters

- Will I keep the same lab partner for Topic-2?
 - In general, NO
 - List of assigned benches for Topic-2 will be on the course web-site: <http://subjects.ee.unsw.edu.au>
- How is the tutorial mark assigned?
 - Not a sum of weekly contribution marks
 - but this can help the tutor generate a reflective mark
 - What is being rewarded is the learning experience
 - you must reflect; you must prepare; you can share your thoughts respectfully with the tutorial group

Dropping in on other labs?

- General policy
 - this is OK, so long as the demonstrators in the other laboratory are happy with it
 - let them know, ask politely and you are probably fine
 - if they ask you to leave, you must do so
- Specific inclusions/exclusions:
 - You can drop in on Elec-1111 labs in 113-114 only at the following times:
 - Mon 9-11; Tue 9-11 & 4-6; Fri 9-11, 12-2 and 2-4
 - You may not drop into 113-114 at the following time:
 - Mon 11-1; Tue 11-1; Wed 11-3