AET 5420 Quiz 1

February 3, 2021

1 DISTORTED ECHO

The Waves H-Delay is a software plug-in that can be used to create echo effects with an "analog" sound (hybrid: digital and analog). There are several different analog characteristics which are emulated in the plug-in. For this problem, we are just going to focus on the "LoFi" distortion that can be added to the echo. A picture of the plug-in interface is shown in Figure 1.1.

Figure 1.1: Waves H-Delay Interface

Let's assume that the "LoFi" distortion adds a bit crushing effect. This effect is only applied to the delayed signal and not applied to the dry path through the plug-in. A block diagram for the combined effect is shown in Figure 1.2.

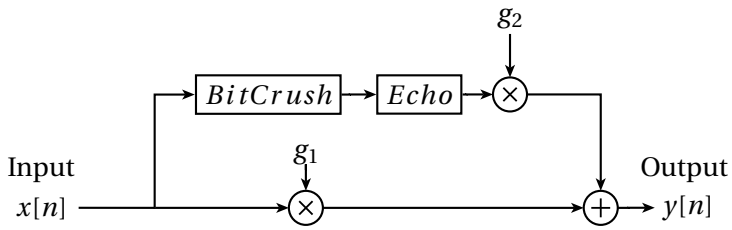

Figure 1.2: Block Diagram of Distorted Echo

The last parameter to consider is the dry/wet knob. This single knob controls both of the gains, g_1 and g_2. If we assume the dry/wet mix knob has a range of 0 (dry-only) to 1 (wet-only), then $g_1 = (1 - mix)$ and $g_2 = mix$.

1.1 Problem

Create and save a **function** (m-file) in MATLAB that performs the following steps. Use the provided test script to verify the performance of your function.

- Name the function: `hDelay.m`
- Use the following input and output variables
  - `x` : mono input signal
  - `Fs` : sampling rate
  - `delayMS` : delay in units of milliseconds
  - `bits` : number of bits for bit crushing
  - `mix` : blend of dry/wet signals
  - `y` : mono output signal
- Process the input signal based on the block diagram shown in Figure 1.2.
- Combine the parallel paths together to create a single output signal
- Experiment with different values in the test script

Remember to add comments to your code to explain what each command is accomplishing. For this problem, you will submit the script file - `testScript.m`, your function file - `hDelay.m`, and the provided sound file.

2 Submission

Email a compressed .zip folder of all the requested files to: eric.tarr@belmont.edu