Triangle History Generation

August 26, 2019

```
In [1]: using CRC
        using Plots

        gr()

Out[1]: Plots.GRBackend()

In [2]: f = 6e6;
        τ = 1e-3;
        n = τ*f;
```
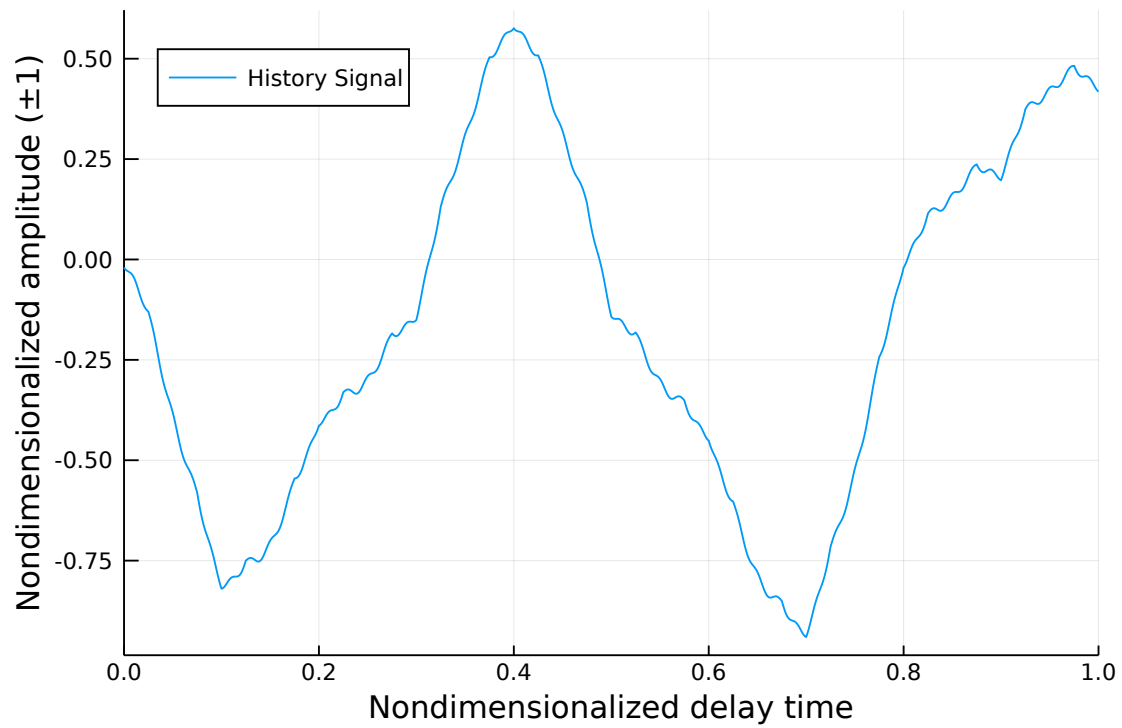
The last two words will be replaced with a value close to 0V (0x0800) when programmed, since we cannot program the initial DAC output.

```
In [3]: g(t) = -0.45 * (0.9 * sin(t * 2.5*3π / 2) * atan(8π * t)
            - 0.1 * abs(atan(sec(t * 20π))) - 0.5 * abs(atan(cot(t * 5π)))
            + 0.02 * cos(100π * t)) - 0.4;
        ts = (0:n-1) / (n-1);
        gs = g.(ts);
        plot(ts, gs, xlim=(0, 1),
            xlabel = "Nondimensionalized delay time",
            ylabel = "Nondimensionalized amplitude (±1)",
            label = "History Signal", legend=:topleft)

Out[3]:
```

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In [4]: little_endian(x) = UInt8.([x & 0x00FF, x >> 8]);
```

```
In [5]: prog_words = UInt16.(round.(2^(12 - 1) * (1 .+ gs))) .& 0x0FFF;
        waveform_file = "./triangle_hist.bin";
        write(waveform_file, prog_words)
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Out[5]: 12000
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In [6]: crc32 = crc(CRC_32);
        prog_crc = crc32(vcat(little_endian.(prog_words)...))
```

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Out[6]: 0x701bff42
```