# Filters and Oscillators

### Lab 12, DSP

## Objective

Students should be able to design basic filters and oscillators in Matlab and implement them in Simulink.

## Exercises

1. Use the Filter Design tool in Matlab (`fdatool`) to design a IIR high-pass filter with order 3, with cutoff frequency 0.07. Implement the filter in Simulink and hear it work on a sample input audio file.
2. Use the Filter Design tool in Matlab (`fdatool`) to design an oscillator with frequency 0.05. Implement it in Simulink, visualize & play the output signal.
   - design a system of order 2 with 2 conjugate poles placed **on the unit circle** at the correct frequency, and 2 zeros at low & high frequencies
   - implement the system in Simulink, **omitting the input signal** (not necessary)
   - set a non-zero initial condition in the system, to start-up the oscillator

## Final questions

1. TBD