

MMI504

Exercise .5

1. Design a resonant filter with multiple resonances described by the following equation:

$$y(n) = 0.5*x(n) + 0.5*x(n-1) + R^L*y(n-L)$$

where $R = 0.999$, $L = 32$

Use the following different inputs and listen to the output for different values of L.

- a. Sawtooth wave
- b. Square wave
- c. $x(n) = \delta(n) - \delta(n-1)$

Why does the change in L affect the overall sound?

2. Design a resonant filter with a resonant frequency of 440 Hz and a bandwidth of 100 Hz. Create noise using the *rand* function as the input and apply the filter to it. Vary the resonant frequency to observe its effects.

MATLAB commands – *filter, fvtool, rand, square, tripuls*