

APPLIED SIGNAL PROCESSING 2011

EXERCISE 2

Synthesis of notes with the plucked-string filter.

Determine the parameters L and a of a tunable plucked-string filter which generates an audio signal with a specified fundamental frequency f_0 (given in Hz) when the sampling frequency is f_s (Hz).

Determine the transfer function from input signal x to output signal y of the tunable plucked-string filter in Fig. 1.5 in the lecture notes.

Use the above results to write a program which plays a given sequence of notes, where the damping R and the duration times are tunable. Test the program on the note sequence 165, 330, 392, 233, 220, 330 Hz with note durations 0.5, 0.25, 0.25, 0.25, 0.5, 0.25 seconds.