PROGRAM Assignment # 5, EE5352

1. Write two programs called Shape2 and Shape 3, each of which has parameters z, h, d, Nz, Nh, and Nd. Nz, Nh, and Nd are the dimensions of arrays z, h, and d respectively. Array z stores a deterministic input signal, array d stores the desired output signal, and array h stores the output shaping filter coefficients. Shape2 finds h by using the Toeplitz recursion, which you should program yourself.

2. Program Shape3 finds h using the conjugate gradient technique, which you should program yourself.

3. Design two filters having Nh=16, using the two programs. The other parameters are Nz = 20 and Nd = 35. The input and desired output signals are

\[ z(n) = \exp(-|n-9|/10.) \cdot \cos(.4(n-9)), \text{ and} \]
\[ d(n) = \exp(-(n-18)^2)/150.) \cdot \cos(.4\cdot(n-3.)). \]

4. List both sets of filter coefficients. After making sure that the two filters are almost identical, plot d(n) and the convolution of z(n) with h(n) for comparison.