Problem Set 4

Issued: Apr. 16, 2024   Due: Apr. 20, 2024

Reading Assignments:

Signals and Systems (OWN), Chapter 9.7-9.8, 10.7-10.8, 11.0-11.2
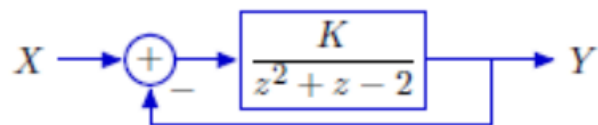
Problem 1 OWN, Problem 11.1

Problem 2 OWN, Problem 11.5

Problem 3 OWN, Problem 11.7

Problem 4 OWN, Problem 11.57

Problem 5
Consider the following feedback system in which the box represents a causal LTI DT system that is represented by its system function.
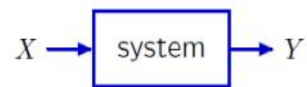

a.   Determine the range of K for which this feedback system is stable.
b.   Determine the range of K for which this feedback system has real-valued poles.

Problem 6 (next page)

An infinite network of resistors is excited by an infinite network of current sources as shown below.
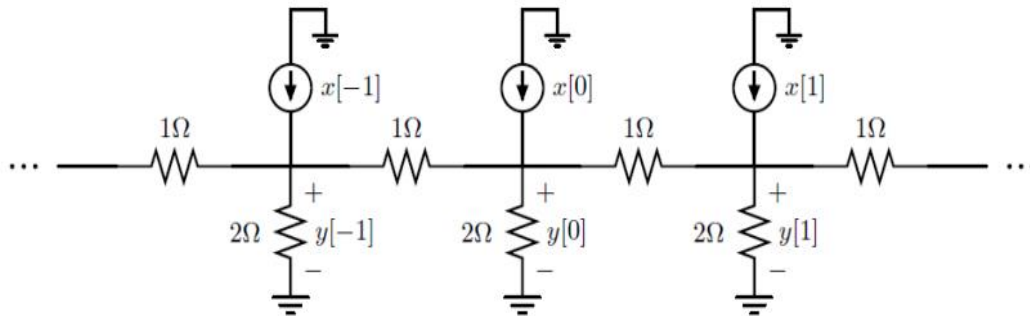
We can consider the transformation from x to y as a DT system.

a. Show that this system is linear and "time"-invariant.

b. Determine the unit-sample response $h[n]$.

c. Determine the system function $H(z)$ and region of convergence.

d. Determine the system's pole(s) and zero(s).