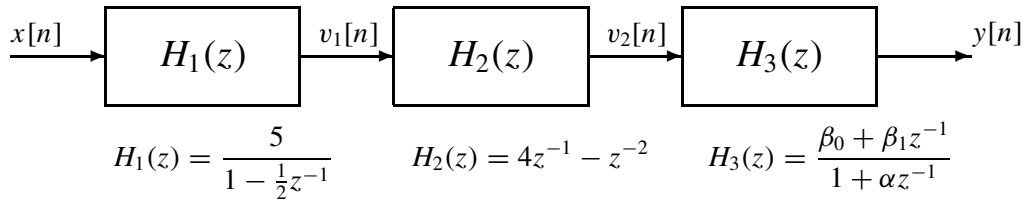


## PROBLEM:

In the following cascade of systems, all systems are defined by their transfer functions.



- (a) Suppose that the cascade of the three systems is equivalent to a unit-delay system (i.e.,  $y[n] = x[n - 1]$ ). Determine the overall system function  $H(z)$  which is a unit-delay. Then state how  $H(z)$  is related to  $H_1(z)$ ,  $H_2(z)$  and  $H_3(z)$ .
- (b) Determine the unknown coefficients of  $H_3(z)$ , so that the overall system will be a unit-delay system. Find numerical values for  $\{\beta_0, \beta_1, \alpha\}$ .