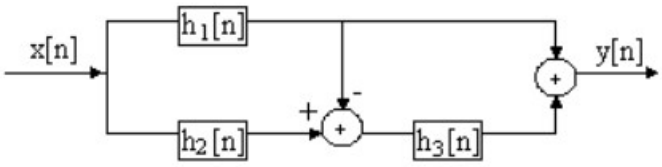
Homework 1

1. Find the impulse response $h[n]$ of the following system, where $h_1[n]=\left(\frac{1}{3}\right)^n u[n]$, $h_2[n]=\left(\frac{1}{2}\right)^n u[n]$ and $h_3[n]=\left(\frac{1}{5}\right)^n u[n]$.



2. Consider the following system:

$$y[n]=0.7\,y[n-1]-0.12\,y[n-2]+x[n-1]+x[n-2]$$

a) Find the system function $H(z)$ and specify if the system is stable or not
b) Find the zero-state response to the input signal $x[n]=n\cdot u[n]$
c) Find the response to the input signal $x[n]=n\cdot u[n]$ if the initial conditions $y[-1]=y[-2]=1$