1. Computation of Z-transform---MATLAB

Consider a discrete-time pulse $x\left[n\right]=u\left[n\right]-u\left[n-10\right].$

1. Plot x[n] as a function of n and use the definition of the Z-transform to find X(z).
2. Use the Z-transform of u[n] and properties of the Z-transform to find X(z). Verify that the expressions obtained above for X(z) are identical.
3. Find the poles and the zeros of X(z) and plot them in the z-plan. Use MATLAB to plot the poles and zeros.
4. Inverse Z-transform –MATLAB

We are interested in the unit-step solution of a system represented by the difference equation

$$y\left[n\right]=y\left[n-1\right]-0.5y\left[n-2\right]+x\left[n\right]+x[n-1]$$

1. Find an expression for Y(z)
2. Do a partial expansion of Y(z)
3. Find the inverse Z-transform y[n] and verify your results using MATLAB.