***2.***

If we want to inverse Z-transform, we use inverse transform integal.

So and,

***3.***

***Analitically;***

If we take the z-transform of the difference equation;

If we rewrite the difference equation;

We put the starting points , and in the equation;

And we get;

Since ;

Residue for the pole K1 = z1 =1;

Residue for the pole K2 = z2 = ½;

**MATLAB:**

**>> % Computer Controlled Systems lecture Project 1, Question 3**

**>> % Due to: 29.02.2016 Group 4**

**>>**

**>> x(1)=1;**

**>> x(2)=2;**

**>> for i=1:1:20**

**x(i+2)=1+x(i+1)-0.25\*x(i);**

**end**

**>> plot(x,'--s')**

****

The system starts and settles at 4.

**4)**

First we need to factorize the transfer function.

After factorization, we can find the discrete time transfer function as below;

Also it can be found by residue theorem,

Respectively, we find the residues for poles;