

MATLAB

ASSIGNMENT -10

Code:

Code:

```
%MATLAB_10
syms y(k) z F T
assume(k>=0 & in(k,'integer'))
eq = y(k+3) + 2*y(k+2) + 3*y(k+1) - y(k) == exp(-
k);
Zt = ztrans(eq,k,z)
Zt = subs(Zt,ztrans(y(k),k,z),F)
F = solve(Zt,F)
pSol = iztrans(F,z,k); % Inverse Z-transform
pSol = simplify(pSol)
pSol = subs(pSol,[y(0) y(1) y(2)],[0 1 0]) %
Initial conditions
kvalues = 1:10;
pSolValues = subs(pSol,k,kvalues);
pSolValues = double(pSolValues);
pSolValues = real(pSolValues);
plot(kvalues,pSolValues)
```

output:

pSol =

```
(exp(3 - k)*(exp(k)*symsum(-(exp(-3))*root(z5^3 + 2*z5^2 +
3*z5 - 1, z5, l)^k*root(z5^3 + 2*z5^2 + 3*z5 - 1, z5,
l)*(3*exp(1) + 4*exp(2) - 2*exp(3) + 2) - root(z5^3 + 2*z5^2 +
3*z5 - 1, z5, l)^k + exp(-3)*root(z5^3 + 2*z5^2 + 3*z5 - 1, z5,
```

$$l)^k \cdot \text{root}(z5^3 + 2 \cdot z5^2 + 3 \cdot z5 - 1, z5, l)^2 \cdot (2 \cdot \exp(1) + 2 \cdot \exp(2) - \exp(3) + 1)) / (2 \cdot \text{root}(z5^3 + 2 \cdot z5^2 + 3 \cdot z5 - 1, z5, l)^2 + 6 \cdot \text{root}(z5^3 + 2 \cdot z5^2 + 3 \cdot z5 - 1, z5, l) - 3), l, 1, 3) + 1)) / (2 \cdot \exp(1) + 3 \cdot \exp(2) - \exp(3) + 1)$$

Graph for the code:

