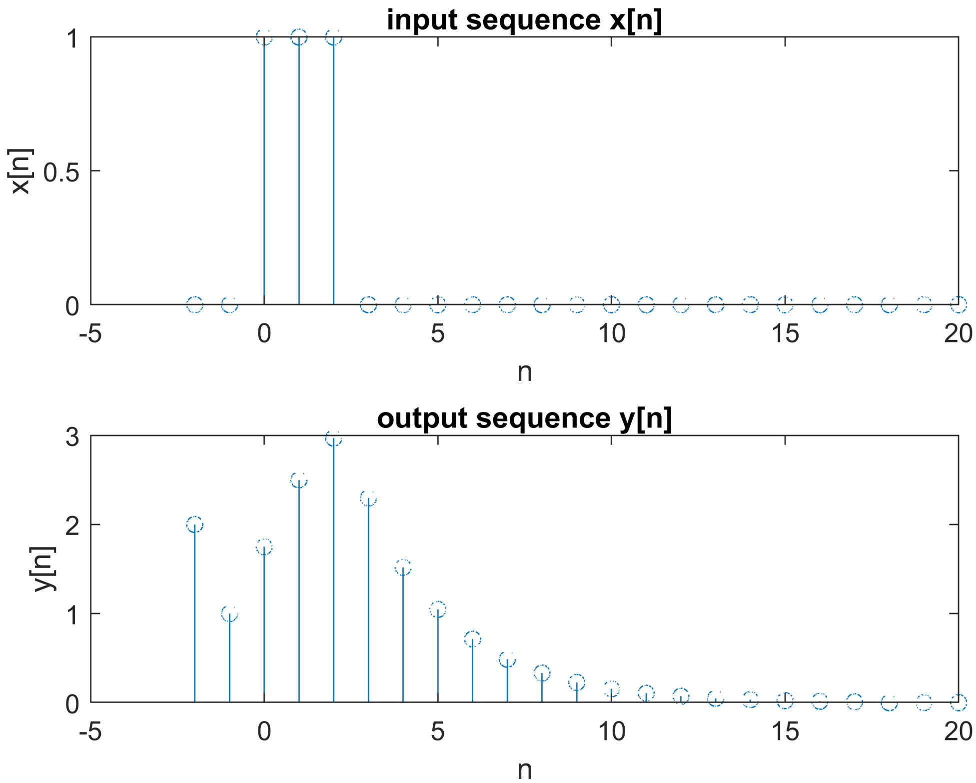
Compute the solution for the following second-order differential equation:

$y(n)-0.25y(n-1)-0.125y(n-2) = x(n) + 0.5x(n-1)$ with initial conditions $y(-1) = 1$, $y(-2) = 2$ and input $x(n) = u(n) - u(n-3)$ using MATLAB and SIMULINK. Compare the computed solution with the analytical solution obtained.

```
b=input('Enter the coefficients of x: ');
a=input('Enter the coefficients of y: ');
M=length(b)-1;
N=length(a)-1;
IC=input('Enter the initial conditions for y: ');
n=-N:20;%number of terms
%x[n]=u[n]-u[n-3]
x=((n>=0))-((n>=3));
subplot(211);
stem(n,x);
title('input sequence x[n]');
xlabel('n');
ylabel('x[n]');
y=[IC zeros(1,length(n)-N)];
for n=N+1:20 %loop runs length(n) times to find y(n)
sumx=0;sumy=0;
for k=0:M
sumx=sumx+(b(k+1)*x(n-k));
end
for k=1:N
sumy=sumy+(a(k+1)*y(n-k));
end
y(n)=sumx-sumy;
end
n=(-N:20);%number of terms
subplot(212);
stem(n,y);
title('output sequence y[n]');
xlabel('n');
ylabel('y[n]');
```




```
disp('y[n]=');
```

```
y[n]=
```

```
disp(y)
```

```
  Columns 1 through 16

    2.0000    1.0000    1.7500    2.5000    2.9688    2.2969    1.5195    1.0469    0.7134    0.4875    0.3329

  Columns 17 through 23

    0.0338    0.0231    0.0158    0.0108         0         0         0
```