

2.18 For the difference equations given next, solve for the sequence $y[n]$, using the program recur for $0 \leq n \leq 10$, and plot y versus n on a stem plot.

(a) $y[n] = y[n - 1] + u[n - 1]; y[-1] = 0$

➤ Label stems on plot.

m-file for part (a)

```
% Problem 2.18a (p2_18a.m)
% Use recursion to solve for y[n] for n = 0 to 10
% based on the I/O difference equation-
% y[n] = y[n-1] + u[n-1] OR y[n] - y[n-1] = u[n-1]
% Initial conditions- y[-1] = 0 & x[0] = 0
% Input- Assume x[n] = 0 & x[n-1] = u[n-1]
clc;clear;close all;
a = [-1]; % a1 coeff. for y[n-1] term
b = [0, 1]; % b0 & b1 coeff. for x[] terms
n = 0:1:10; % range of indices
x = ones(1,length(n)); % Set up input signal
% Initial conditions
x0 = [0]; y0 = [0]; % x[0] = 0 & y[-1] = 0
y = recur(a,b,n,x,x0,y0); % Calculate filter response recursively
stem(n,y,'r.','linewidth',1.5,'markersize',18),
axis([-0.5 10.6 0 11]);
ylabel({'\ity}{[\itn]}','fontsize',16,'fontname','times')
xlabel({'\itn'],'fontsize',16,'fontname','times')
title({'Problem 2.18a','y[n] - y[n-1] = u[n-1] w/ y[-1] = 0'},...
'fontsize',16,'fontname','times')
for l=1:length(y), % Label stems with the value of y[]
    text(n(l)-0.05,y(l)+0.1,[' ' num2str(y(l),4)],...
        'HorizontalAlignment','center','VerticalAlignment','bottom')
end
set(findobj('type','text'),'fontname','times','fontsize',12)
set(findobj('type','line'),'linewidth',1.5,'markersize',18)
set(findobj('type','axes'),'linewidth',2)
```

Problem 2.18a

