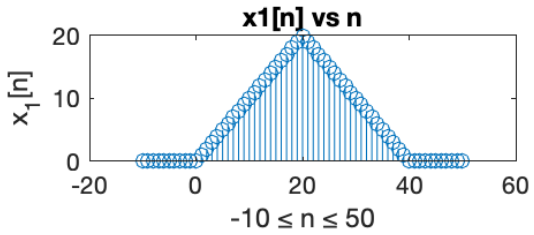
Matlab HW1

電機二 張牲源(B11901123)

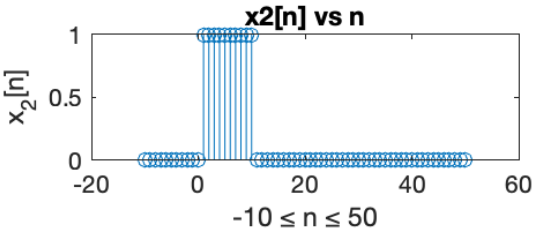
3/26/2024

1. Result

(a)

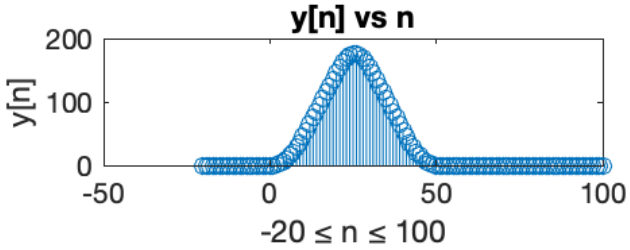


$x_1[n]$ vs n



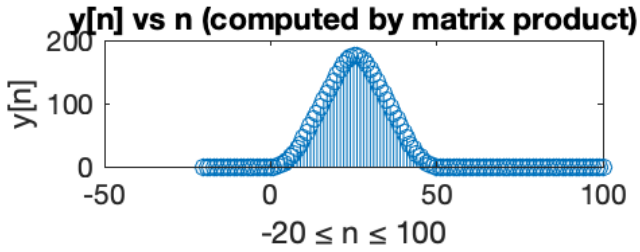
$x_2[n]$ vs n

(b)



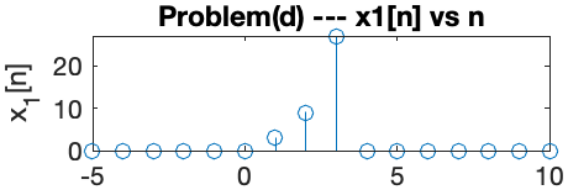
$y[n]$ vs n

(c)

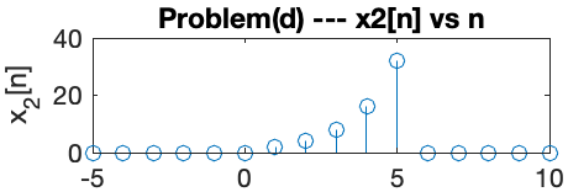


$y[n]$ vs n

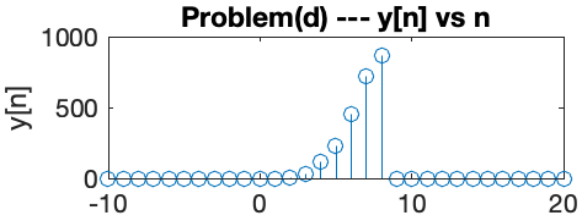
(d)



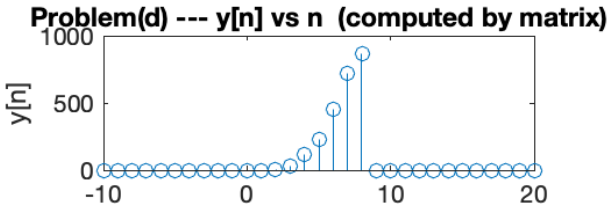
$x_1[n]$ vs n



$x_2[n]$ vs n



$y[n]$ vs n



$y[n]$ vs n

2. Code

(1) Function definition

```
A1 = zeros(2*length(a1)-1,length(a1));
for i = 1:length(a1)
    for j = 1:length(a1)
        A1(i+j-1,j) = a1(i);
    end
end

B1 = b1';
```

(2) Function call

```
%%
convAB1x = nexttile;
stem(convAB1x,-20:100,(A1*B1)')
xlabel('-20 ≤ n ≤ 100')
ylabel('y[n]')
title(convAB1x,'y[n] vs n (computed by matrix product)')
```

(3) Verification

```
%%
function compareFunctions (x1, x2)
    len = length(x1);
    identical = true;
    for i = 1:len
        if ne(x1(i), x2(i))
            identical = false;
            break;
        end
    end

    if identical
        disp("The functions are identical.")
    else
        disp("The functions are not indentical.");
    end
end
```

Command Window

```
Comparing (b) and (c)
The functions are identical.
Comparing (d)-3 and (d)-4
The functions are identical.
>>
```

Using the verification code, it shows that the output of the convolution computed by the matrix method is identical to the one computed using conv() function.