

MATLAB R2022b - academic use

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homework1.m MATLAB_review.m homework3_question197.mlx Homework2.mlx Problem_2.83.mlx

Problem 2.83 for 2.34(b)

Repeat Problem 2.34(b), using MATLAB conv command.

```

1  n = -5:5;
2  x = zeros(size(n));
3
4  x(n== -5) = 1; x(n== -4) = 1; x(n== -3) = 1; x(n== -2) = 1; x(n== -1) = 1; x(n== 0) = 1; x(n== 1) = 1;
5
6  subplot(3, 1, 1);
7  stem(n, x, 'filled','Color','r')
8  ylim([-2 2])
9  xlabel('n')
10 ylabel('x[n]')
11 grid on
12
13 y = zeros(size(n));
14
15 y(n== -3) = 1; y(n== -2) = 1; y(n== -1) = 1; y(n== 0) = 1; y(n== 1) = -1; y(n== 2) = 1; y(n== 3) = -1; y(n== 4) = -1;
16
17 subplot(3, 1, 2);
18 stem(n, y, 'filled','Color','b')
19 ylim([-2 2])
20 xlabel('n')
21 ylabel('y[n]')
22 grid on
23
24 subplot(3, 1, 3);
25 m = conv(x, y);
26 n_convolved = (n(1) + n(1)) : (n(end) + n(end));
27 stem(n_convolved, m, 'filled','Color','m')
28 xlabel('n')
29 ylabel('m[n] = x[n] * y[n]')
30 grid on
31
32 % This is what m is in variables...
33 % 0 0 1 2 3 4 3 2 1 -1 -2 -3 -4 -3 -2 -1 0 0 0 0 0
34 % Which equates to ...
35 % m[n] =      0[n+8] + 26[n+7] + 36[n+6]
36 %       + 46[n+5] + 36[n+4] + 26[n+3]
37 %       -  8[n+2] -  8[n+1] - 26[n]
38 %       - 36[n-1] - 46[n-2] - 36[n-3]
39 %       + 26[n-4] -  8[n-5]
40 % Which matches the graph!

```

