
```
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%Original from Ted Obuchowicz
% Apr 23, 2012 16:28

% determines if the given system
%  $y[n] = 2 * x[n]$  produces outputs consistent with a linear
% system
clear
% define n
n = [ 0 : 4 ]
% define the input  $x1[n] = n$ 
x1 = n
% define input  $x2[n] = 2 * n$ 
x2 = 2 * n
% define the response  $y1[n] = 2 * x1[n]$ 
y1 = 2 * x1
% define the response  $y2[n] = 2 * x2[n]$ 
y2 = 2 * x2
% define  $x3[n] = A * x1[n] + B * x2[n]$ 
% for simplicity we make  $A = B = 1$  in this example
x3 = x1 + x2 ;
% define the response  $y3[n] = 2 * x3[n]$ 
y3 = 2 * x3
% Check if  $y3[n] = y1[n] + y2[n]$ 
if ( y3 == ( y1 + y2 ) )
disp( 'Outputs are consistent with a linear system')
else
disp( 'System is not linear')
end
% stem plots of the responses may also be obtained
```

```
n =
```

```
    0    1    2    3    4
```

```
x1 =
```

```
    0    1    2    3    4
```

```
x2 =
```

```
    0    2    4    6    8
```

```
y1 =
```

```
    0    2    4    6    8
```

$y_2 =$

0 4 8 12 16

$y_3 =$

0 6 12 18 24

Outputs are consistent with a linear system

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