

2.31

Consider the system $y[n] = y[n-1] + y[n-2] + x[n]$, $y[-1] = y[-2] = 0$.

(a) Compute and plot the impulse response, for $0 \leq n \leq 100$, using function `filter`.

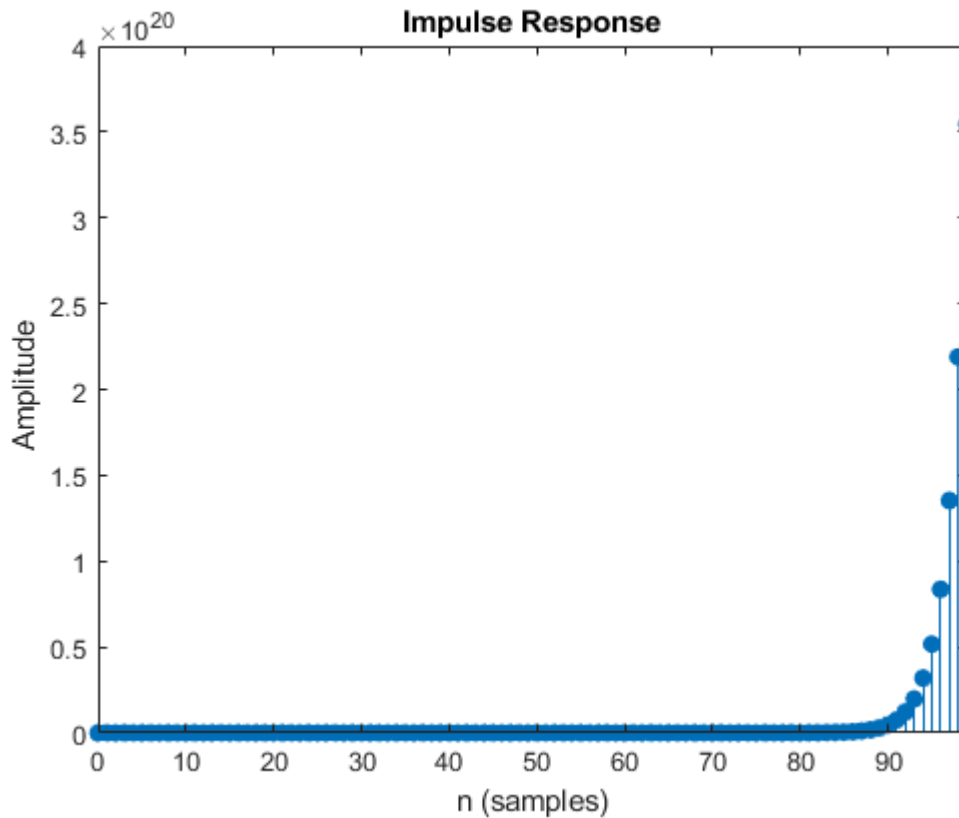
(b) Can you draw any conclusions about the stability of this system from the results in (a)?

(c) Determine the output $y[n]$, if the input is $x[n] = a^n$, $-\infty < n < \infty$, and comment upon the result.

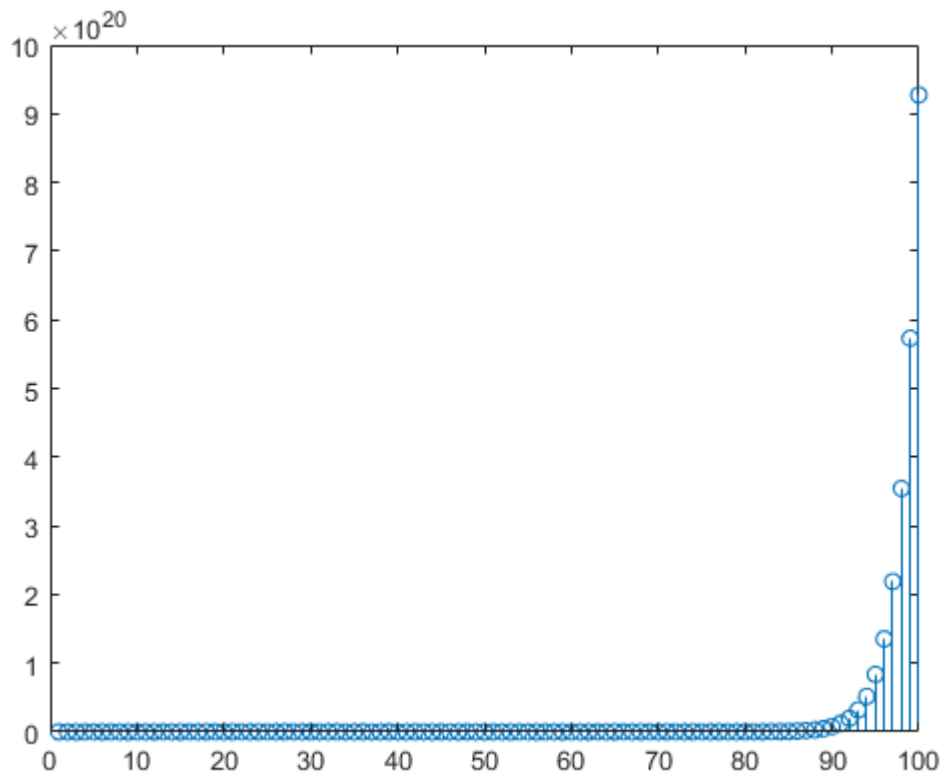
a)

```
a = [1 -1 -1];  
b = [1];  
n = [1;100];
```

```
figure;  
impz(b,a,100)
```



```
y = filter(b,a,ones(1,100));  
figure;  
stem(y)
```

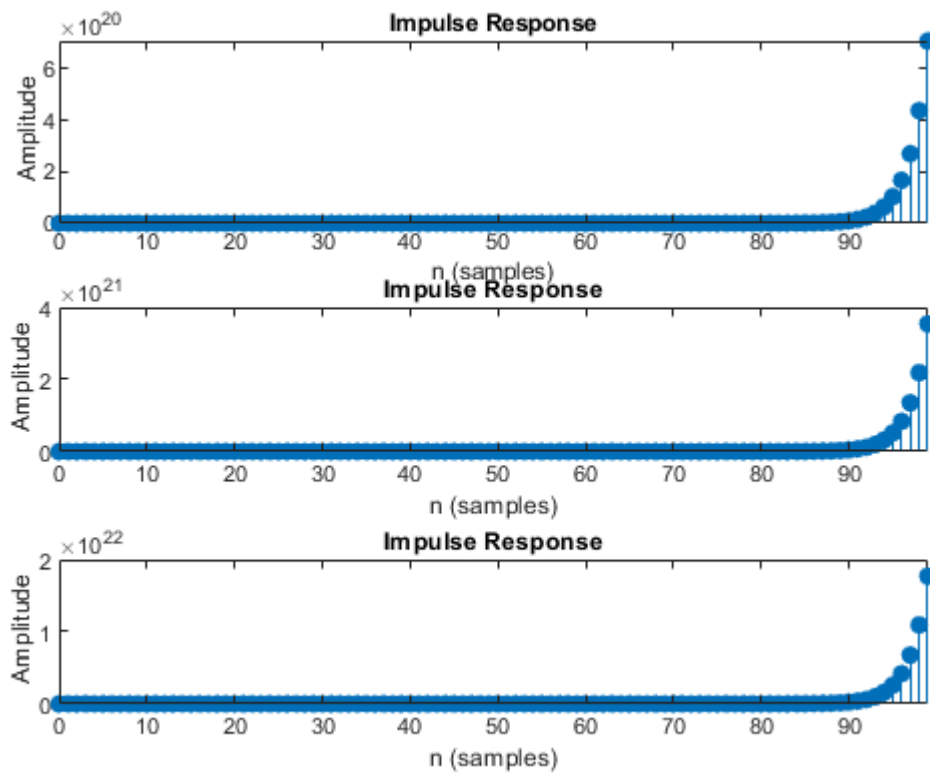


b) The Function is not decaying and continues and hence is not stable.

c)

```
c = [2];
d = [10];
e = [50];

figure;
subplot(3,1,1)
impz(c,a,100)
subplot(3,1,2)
impz(d,a,100)
subplot(3,1,3)
impz(e,a,100)
```



The shape of impulse response will remain the same however. the amplitude now increases at a greater exponential scale