① Text 7-8 a, b

(a) $y[n] = x[n] - 0.9\,y[n-1]$

| $n$ | $x[n]=\delta[n]$ | $-0.9\,y[n-1]$ | $y[n]=h[n]=x[n]-0.9y[n-1]$ |
|---|---|---|---|
| $-1$ | 0 | 0 | 0 |
| 0 | 1 | 0 | 1 |
| 1 | 0 | $-.9$ | $-.9$ |
| 2 | 0 | $(-.9)^2$ | $(-.9)^2$ |
| 3 | 0 | $(-.9)^3$ | $(-.9)^3$ |

$$h[n] = (-0.9)^n u[n]$$

$$\sum_{n=-\infty}^{\infty} |h[n]| = \sum_{n=0}^{\infty} (0.9)^n = \frac{1}{1-.9} = \frac{1}{.1} = 10$$

yes, <u>BIBO stable</u>.

(b) $y[n] = x[n] + 1.1\,y[n-1]$

| $n$ | $x[n]=\delta[n]$ | $1.1\,y[n-1]$ | $y[n]=h[n]=x[n]+1.1y[n-1]$ |
|---|---|---|---|
| $-1$ | 0 | 0 | 0 |
| 0 | 1 | 0 | 1 |
| 1 | 0 | 1.1 | 1.1 |
| 2 | 0 | $(1.1)^2$ | $(1.1)^2$ |
| | | ⋮ | ⋮ |

$$h[n] = (1.1)^n u[n]$$

$$\sum_{n=-\infty}^{\infty} |h[n]| = \sum_{n=0}^{\infty} (1.1)^n = \infty$$

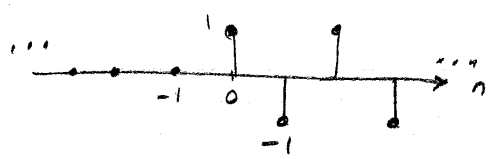
<u>NOT BIBO stable</u>

(2)

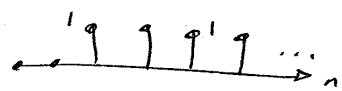
7-16 Cannot determine if BIBO stable: to prove if BIBO stable, must assume $|x[n]| < \infty$, but $\text{ramp}[n] \to \infty$ as $n \to \infty$.

(3) Text, 7-18

$h[n]$:




$|h[n]| =$




$$\sum_{n=-\infty}^{\infty} |h[n]| = \infty \Rightarrow \text{NOT } \underline{\text{BIBO stable}}$$