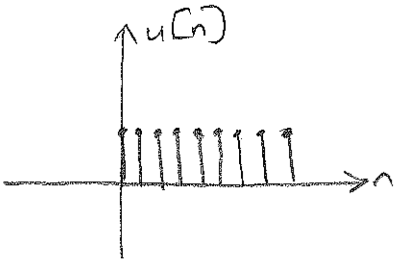
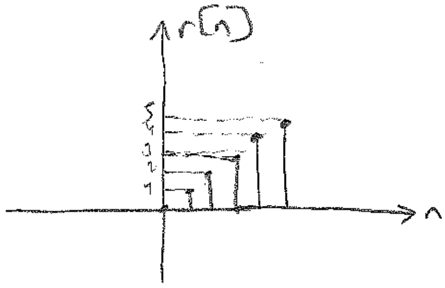
Ramp Function

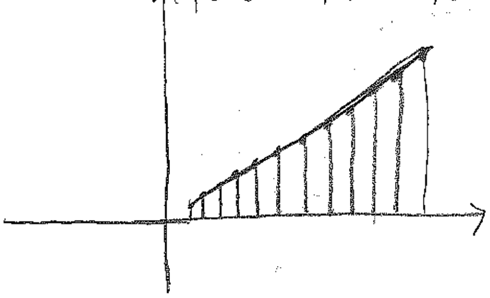
$r[n] = n u[n]$





$$r[n] = \begin{cases} n & n \geq 0 \\ 0 & \text{else} \end{cases}$$

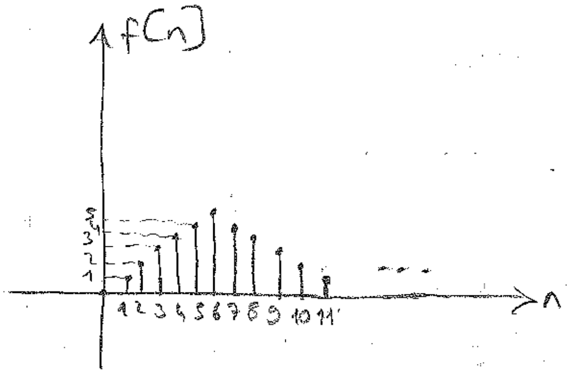
$f[n] = f_1[n] f_2[n] = n u[n]$



$$\boxed{r[n] = \sum_{k=0}^{\infty} u[n-k] = \sum_{k=0}^{\infty} k\,\delta[n-k]}$$

Example

Draw the graph for $f[n] = r[n] - 2r[n-6] + r[n-11]$



We can also have the exponential signal in discreate form

$$f[n] = \begin{cases} ke^{-n} & n \geq 0 \\ 0 & \text{other} \end{cases} \Rightarrow f[n] = ke^{-n} u[n] \quad k \in \mathbb{R}$$

Comparison of discreate and continuous time signals for periocity

— Continuous time

1) Takes different values for different w values
2) It is periodic for any w_0 value
3) The fundamental frequency is $\frac{2\pi}{|w_0|}$