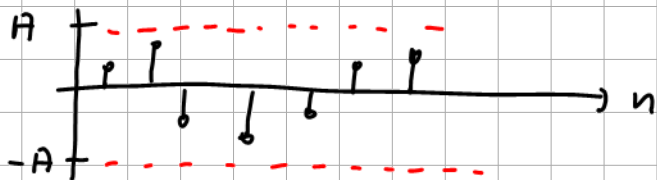


Derivation of  $\delta$

$$\text{dB FS: } L = 10 \log_{10} \frac{2P}{A^2}$$

$$P = \frac{1}{N} \sum_n x_{cn}^2$$



$$y_{cn} = x_{cn} - a \Rightarrow a = \frac{1}{N} \sum_n x_{cn}$$

$z_{cn}$  should have given  $L$  in dB FS with

$$z_{cn} = \delta \cdot y_{cn}$$

$$L = 10 \log_{10} \frac{2P}{A^2} = 10 \log_{10} \frac{2 \cdot \frac{1}{N} \sum_n z_{cn}^2}{A^2}$$

$$= 10 \cdot \log_{10} \frac{2 \cdot \sum_n b^2 y_{cn}^2}{N \cdot A^2}$$

$$= 10 \log_{10} b^2 \frac{2}{N A^2} \sum_n y_{cn}^2 \rightarrow \text{const regarding } n$$

$$\frac{L}{10} = \log_{10} b^2 \frac{2}{N A^2} \sum_n y_{cn}^2$$

$$10^{L/10} = b^2 \frac{2}{N A^2} \sum_n y_{cn}^2$$

$$\frac{10^{L/10} \cdot N A^2}{2 \cdot \sum_n y_{cn}^2} = b^2$$

$$b = \sqrt{\frac{10^{L/10} \cdot N A^2}{2 \cdot \sum_n y_{cn}^2}}$$

$$y = x - a$$

$$a = \frac{1}{N} \sum x$$

$$z = b \cdot y$$

$$\frac{1}{N} \sum_n z^2 = 1 \quad \text{Variance / Power of a Signal}$$

$$\frac{1}{N} \sum_n b^2 y^2 = 1$$

$$b^2 \cdot \frac{1}{N} \sum_n y^2 = 1$$

$$b = \frac{1}{\sqrt{\frac{1}{N} \sum_n y^2}} = \frac{1}{|\sigma|}$$

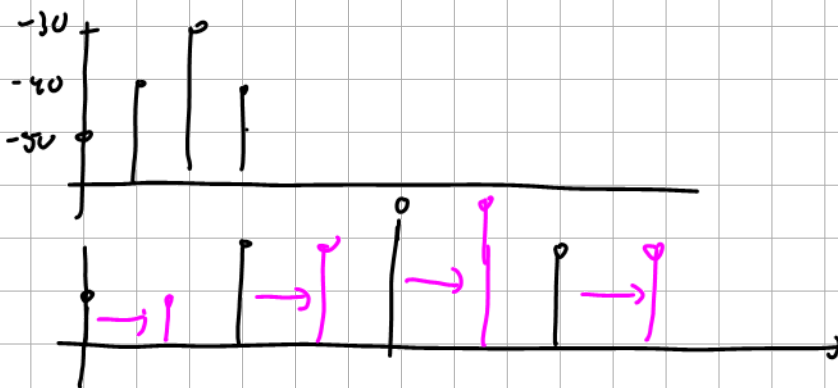
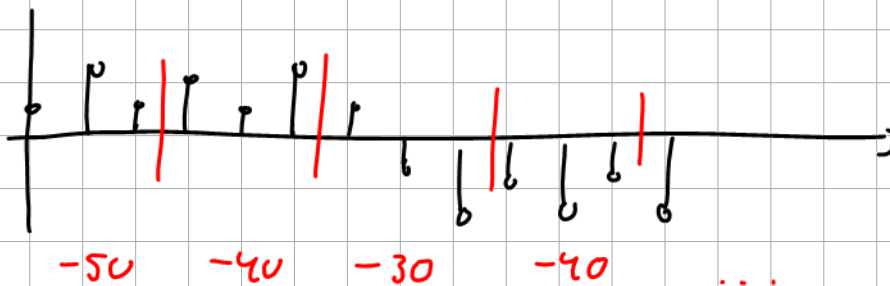
Input  $x$

$$\text{temp} = \frac{1}{N} \sum_n x^2$$

$$z = x / \sqrt{\text{temp}} \quad \sum$$

$$\frac{1}{N-1} \sum_n z^2$$

Blocksize 2, Samples = 3



# Classification with 2 Features:

