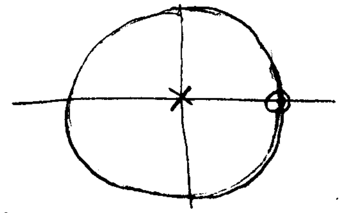
Example: h(k)= (1, -1, 0, 0, ..) with $f_s := 1$ and $t_s := \frac{1}{f_s}$



The z-transform and Fourier transform (i.e., frequency response) are

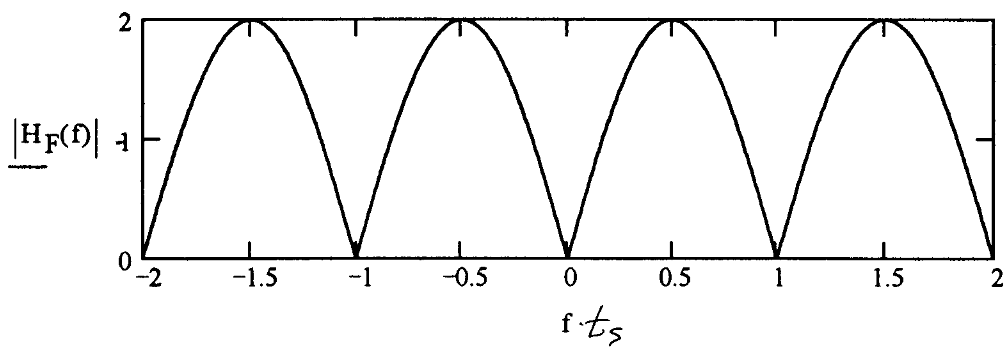
$$H_Z(z) := 1 - z^{-1} \qquad H_F(f) := 1 - e^{-j \cdot 2 \cdot \pi \cdot f \cdot t_s} \qquad \text{since } z = e^{j \cdot 2 \cdot \pi \cdot f \cdot t_s}$$

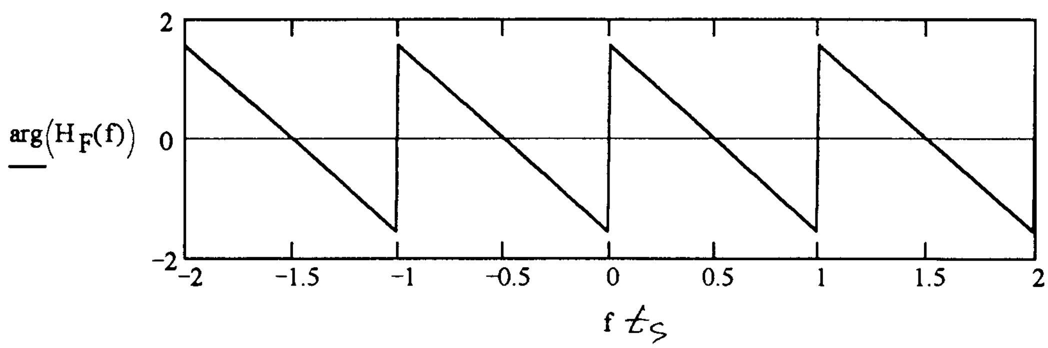
The magnitude and phase are

$$\left|H_F(f)\right| = \sqrt{H_F(f) \cdot \overline{H_F(f)}} = \sqrt{2 - 2 \cdot \cos\left(2 \cdot \pi \cdot f \cdot t_s\right)} = \sqrt{4 \cdot \sin\left(\pi \cdot f \cdot t_s\right)^2} = 2 \cdot \left|\sin\left(\pi \cdot f \cdot t_s\right)\right|$$

$$\arg\left(H_F(f)\right) = \operatorname{atan}\left(\frac{\sin\left(2 \cdot \pi \cdot f \cdot t_s\right)}{1 - \cos\left(2 \cdot \pi \cdot f \cdot t_s\right)}\right)$$

$$f := -2 \cdot f_s, -1.99 \cdot f_s .. 2 \cdot f_s$$





Notes: (1) It removes DC; (2) Frequency response is periodic - no surprise, since equispaced discrete in one domain implies periodic in the other.