

Phase Distortion

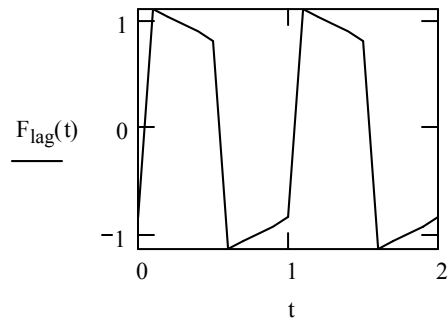
$$t := 0, 0.1 \dots 2 \quad n := 1 \dots 50$$

$$B_n := \frac{4}{\pi \cdot (2 \cdot n - 1)}$$

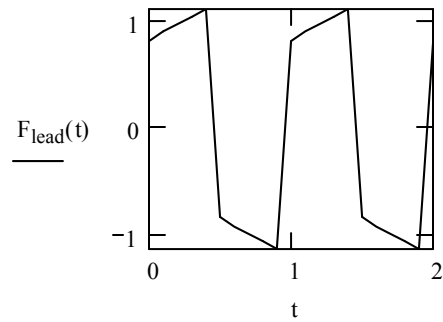
$$dt_n := 0.05 \cdot [1 - \exp[-(2 \cdot n - 1)]]$$

$$F_{\text{lag}}(t) := \sum_n \left[B_n \cdot \sin \left[(2 \cdot n - 1) \cdot 2 \cdot \pi \cdot (t - dt_n) \right] \right]$$

$$F_{\text{lead}}(t) := \sum_n \left[B_n \cdot \sin \left[(2 \cdot n - 1) \cdot 2 \cdot \pi \cdot (t + dt_n) \right] \right]$$



(a) high frequency components lagging



(b) high frequency components leading