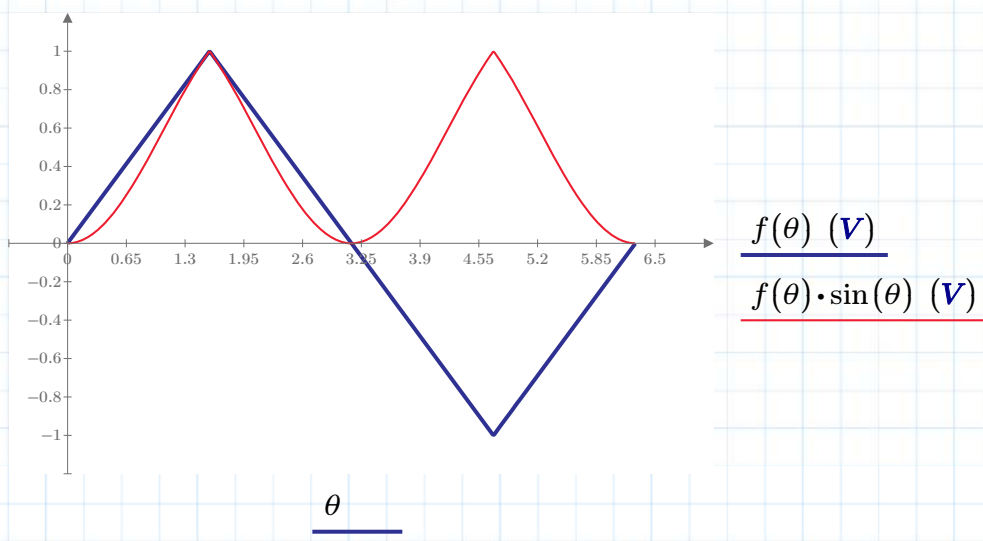


## Ex.F3 Fourier-Analysis (Triangle wave)

$$E_m := 1 \text{ V} \quad f := 50 \text{ Hz} \quad \phi := 0 \text{ deg} \quad \omega := 2 \cdot \pi \cdot f$$

$$\theta := 0, 0.01 \dots 2 \pi$$

$$f(\theta) := \sum_{n=1}^{100} \left( \frac{8 \cdot E_m}{\pi^2} \frac{-(-1)^n}{(2 \cdot n - 1)^2} \cdot \sin((2 \cdot n - 1) \cdot (\theta + \phi)) \right)$$



$$b_1 := \frac{2}{2 \cdot \pi} \int_0^{2 \cdot \pi} f(\theta) \cdot \sin(\theta) d\theta$$

$$b_1 = 0.811 \text{ V}$$

$$\frac{8 \cdot E_m}{\pi^2} = 0.811 \text{ V}$$

$$b_1 := \frac{2}{\pi} \int_0^{\pi} f(\theta) \cdot \sin(\theta) d\theta$$

$$b_1 = 0.811 \text{ V}$$

$$b_1 := \frac{2}{\pi} \int_0^{\frac{\pi}{2}} f(\theta) \cdot \sin(\theta) d\theta$$

$$b_1 = 0.811 \text{ V}$$

$$b_1 := \frac{2}{3 \cdot \pi} \int_0^{\frac{3 \cdot \pi}{2}} f(\theta) \cdot \sin(\theta) d\theta$$

$$b_1 = 0.811 \text{ V}$$

$$b_1 := \frac{2}{\frac{\pi}{3}} \int_0^{\frac{\pi}{3}} f(\theta) \cdot \sin(\theta) d\theta$$

$$b_1 = 0.416 \text{ V}$$

$$b_1 := \frac{2}{\frac{3 \cdot \pi}{2}} \int_0^{\frac{3 \cdot \pi}{2}} f(\theta) \cdot \sin(\theta) d\theta$$

$$b_1 = 0.811 \text{ V}$$

$$t := 0 \text{ s}, 0.0001 \text{ s} \dots 0.02 \text{ s} \quad \omega = 314.159 \frac{1}{\text{s}} \quad \phi := 0 \text{ deg}$$

$$Tri(t) := \sum_{n=1}^{100} \left( \frac{8 \cdot Em}{\pi^2} \cdot \frac{-(-1)^n}{(2 \cdot n - 1)^2} \cdot \sin((2 \cdot n - 1) \cdot (\omega \cdot t + \phi)) \right)$$

