

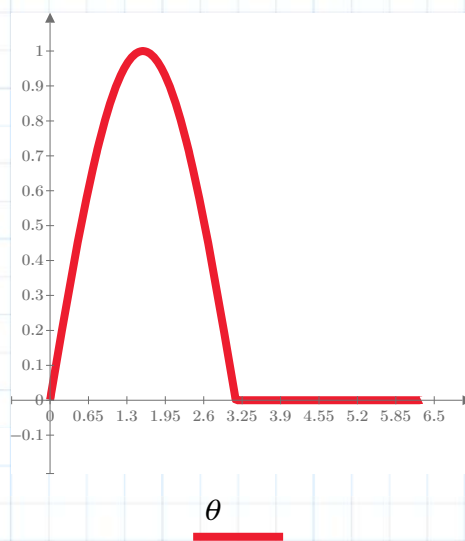
Ex.F5 Fourier-Analysis (Half-Wave Rectification)

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

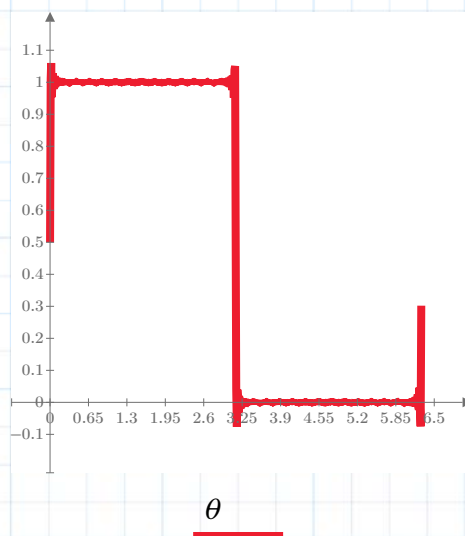
$$m := 100 \quad m: \text{ Number of harmonics}$$

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

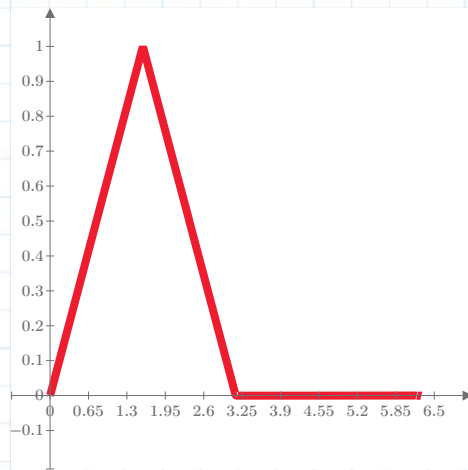
$$f(\theta) := \frac{1}{\pi} + \sum_{n=1}^m \left(\frac{2}{\pi} \frac{-1}{(2 \cdot n)^2 - 1} \cdot \cos(2 \cdot n \cdot (\theta + \phi)) \right) + \frac{1}{2} \sin(\theta + \phi)$$



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



$$f(\theta) := \frac{1}{4} + \frac{2}{\pi^2} \cdot \left(\sum_{n=1}^m \left(\frac{-\cos(2 \cdot (2n-1) \cdot (\theta + \phi))}{(2 \cdot n - 1)^2} \right) \right) + \frac{4}{\pi^2} \cdot \left(\sum_{n=1}^m \left(\frac{-(-1)^n \cdot \sin((2 \cdot n - 1) \cdot (\theta + \phi))}{(2 \cdot n - 1)^2} \right) \right)$$



$f(\theta)$

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