

MEE 390 Problem 2.5

Apply moving average to the given function $y(t)$ over a range $(t-wdt/2 < t < t+wdt/2)$ and discuss the results.

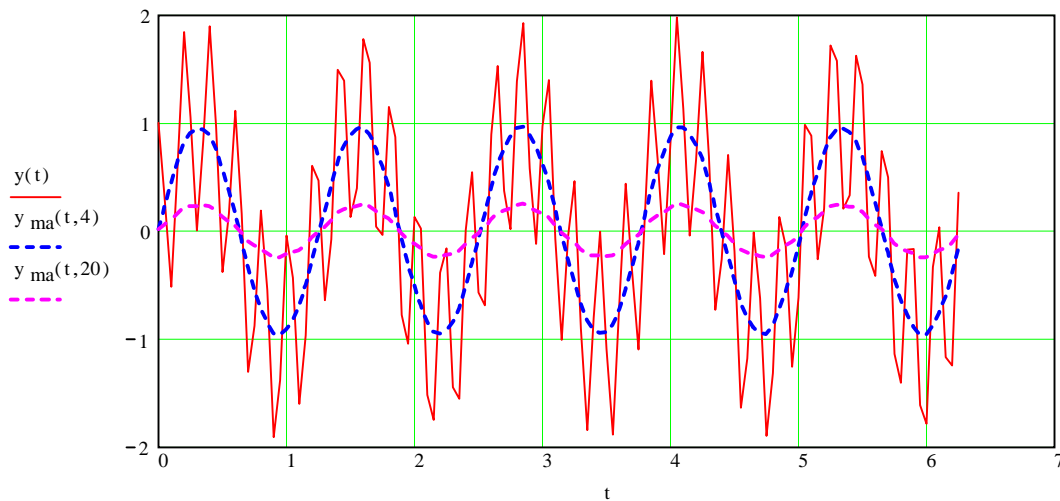
$$\omega_1 := 5 \quad \omega_2 := 31 \quad f_1 := \frac{\omega_1}{2 \cdot \pi} \quad f_2 := \frac{\omega_2}{2 \cdot \pi} \quad T_1 := \frac{1}{f_1} \quad T_1 = 1.257$$

$$y(t) := \sin(\omega_1 \cdot t) + \cos(\omega_2 \cdot t) \quad \text{Given function "y(t)"} \quad T_2 := \frac{1}{f_2} \quad T_2 = 0.203$$

Solution:

$dt := 0.05 \quad T := 2 \cdot \pi \quad t := 0, dt.. T$ Discretization interval "dt" and range "T" of independent variable "t"

$$y_{ma}(t, w) := \frac{1}{w \cdot dt} \cdot \int_{t - \frac{w \cdot dt}{2}}^{t + \frac{w \cdot dt}{2}} y(t) dt \quad \text{Function's moving average over the window range "wdt" (or "w" points)}$$



COMMENT: Increasing the moving average window (averaging range) emphasizes longer term variations and removes short-term fluctuations (high frequency content). Also, the pick-to-pick value is reduced in moving average as compared to the original function.