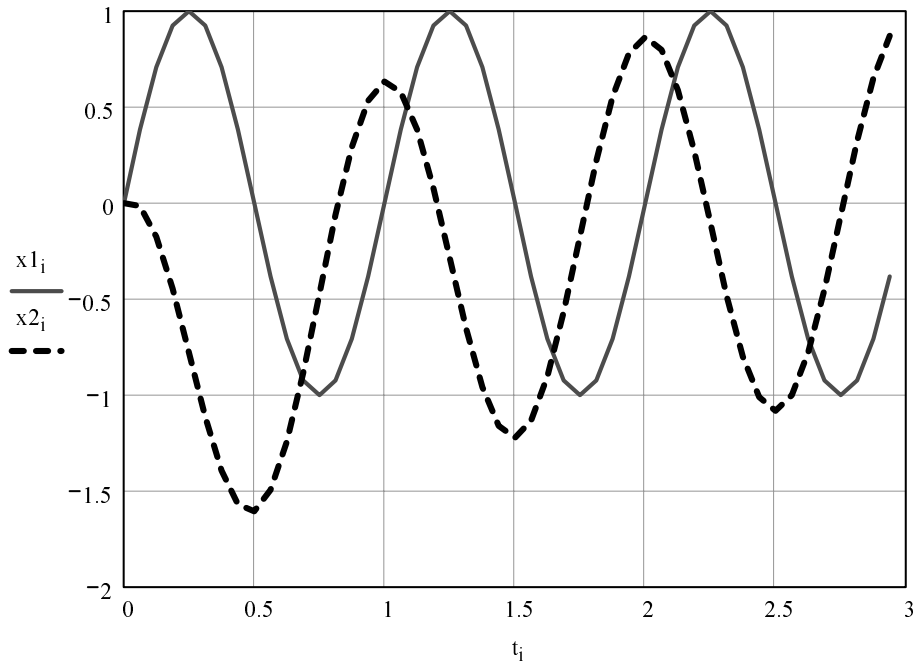


Mimic Filter

NT := 3 f := 60 S := 16 dt := $\frac{1}{S}$

i := 0.. NT·S - 1 t_i := dt·i τ := 1 x1_i := sin(2·π·t_i) x2_i := cos(2·π·t_i) - e ^{$\frac{-t_i}{\tau}$}



N := rows(x1) n := 0.. N - 1 N = 48

y1r := digitalfilter(x1, Zn, Zd) y2r := digitalfilter(x2, Zn, Zd)

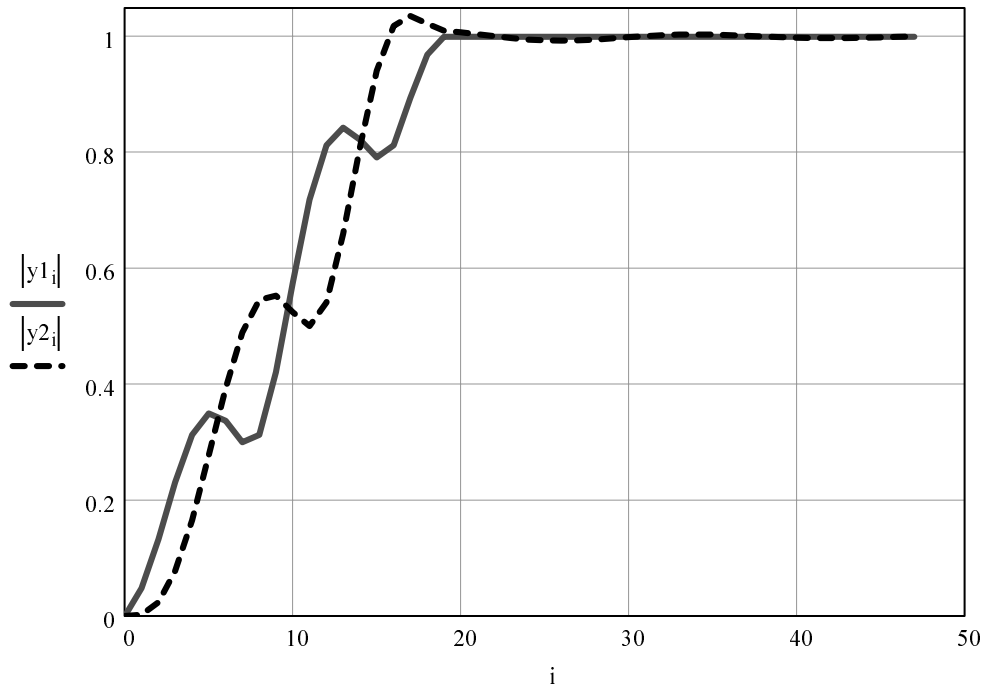
y1i := digitalfilter(y1r, Znim, Zdim) y2i := digitalfilter(y2r, Znim, Zdim)

y1_n := y1r_n + (i·y1i)_n y2_n := y2r_n + (i·y2i)_n

$$PI0 := \sum_{i=0}^{NT \cdot S - 1} \left(|y1_i| - |y2_i| \right)^2 \quad PI0 = 0.422$$

$$PI1 := \sum_{i=16}^{NT \cdot S - 1} \left(1 - |y2_i| \right)^2 \quad PI1 = 2.633 \times 10^{-3}$$

$$PI2_1 := (|y2_i| - 1) \cdot 100 \quad \max(PI2) = 3.594$$



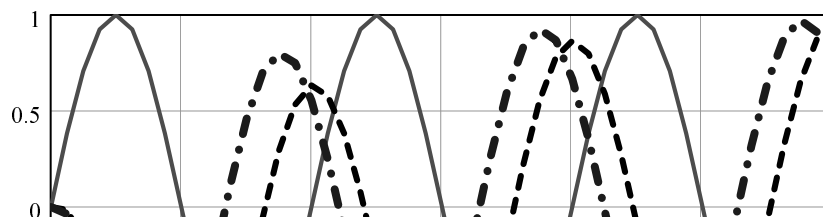
$$\tau 1 := 3$$

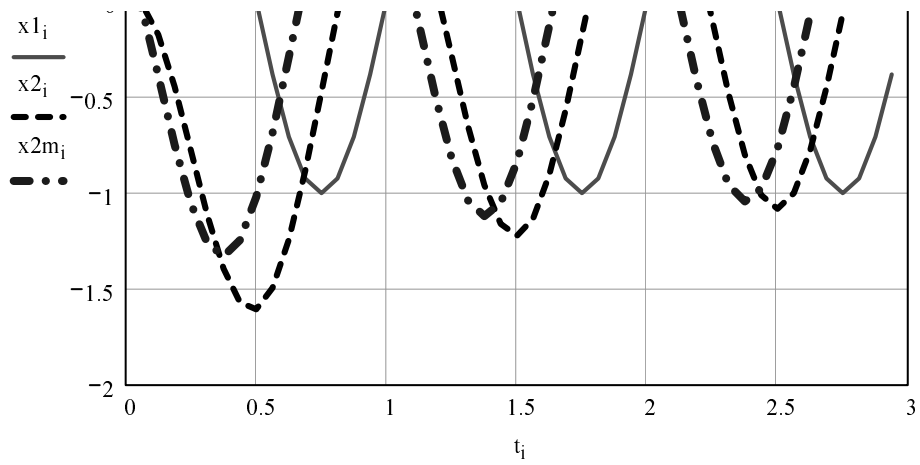
$$K := \sqrt{\frac{1}{\left[\left((1 + \tau 1) - \tau 1 \cdot \cos\left(2 \cdot \pi \cdot \frac{F}{F \cdot S} \right) \right)^2 + \left[(\tau 1) \cdot \sin\left(2 \cdot \pi \cdot \frac{F}{F \cdot S} \right) \right]^2 \right]}}$$

$$K = 0.595$$

$$FMn := \begin{bmatrix} (1 + \tau 1) & -\tau 1 \end{bmatrix} \cdot K \quad FMd := (1 \ 0)$$

$$x2m := \text{digitalfilter}(x2, FMn^T, FMd^T)$$





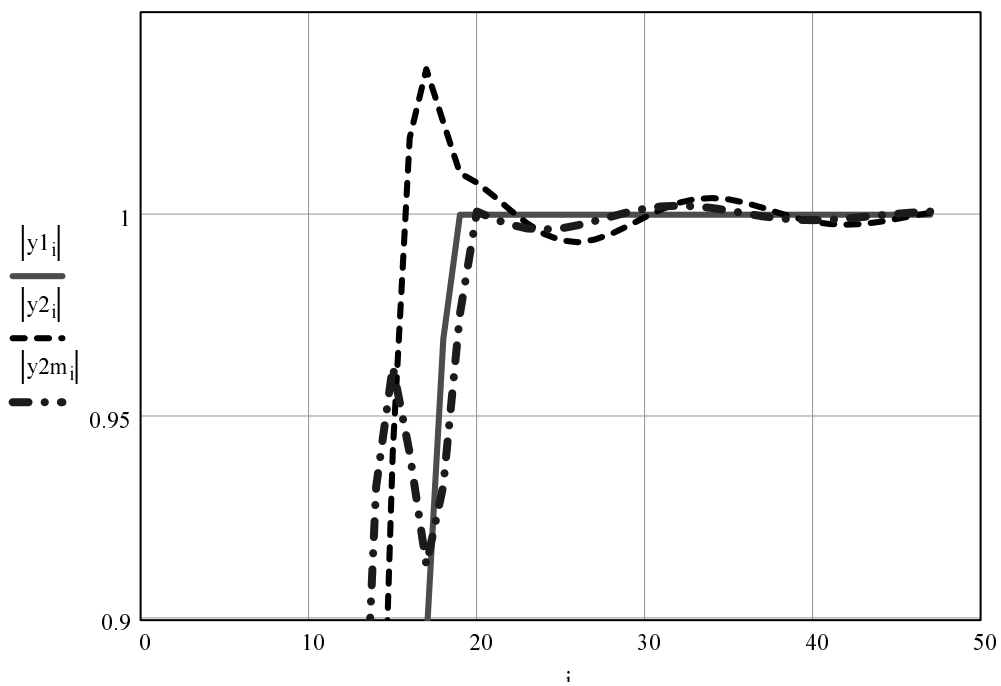
$y2mr := \text{digitalfilter}(x2m, Zn, Zd)$

$y2mi := \text{digitalfilter}(y2mr, Znim, Zdim)$

$y2m_n := y2mr_n + (i \cdot y2mi)_n$

$$PI1m := \sum_{i=16}^{NT \cdot S - 1} (1 - |y2m_i|)^2 \quad PI1m = 0.016$$

$$PI2m_i := (|y2m_i| - 1) \cdot 100 \quad \max(PI2m) = 0.223$$



DFT Filter

$Ndft := 16$ $nf := 0..Ndft - 1$

$$Zd_{nf} := 0 \quad Zd_0 := \frac{Ndft}{2}$$

$$Zn_{nf} := \operatorname{Re} \left(e^{-i \cdot 2 \cdot \pi \cdot \frac{nf}{Ndft}} \right)$$

Cosine Filter

$$Znim := 0.. \left(\frac{Ndft}{4} \right) \quad Zdim := 0.. \left(\frac{Ndft}{4} \right) \quad \text{Delayed Cosine Filter}$$

$$Znim \left(\frac{Ndft}{4} \right) := 1 \quad Zdim_0 := 1$$

Digital Filtering Subroutine

```
digitalfilter(x,Zn,Zd) :=
  Nd ← rows(Zd)
  Nn ← rows(Zn)
  Nx ← rows(x)
  for k ∈ 0..Nx
    yk ← 0
  jn ← 0
  jd ← 0
  for n ∈ 0..Nx - 1
    z0 ← xn
    yn ← 0
    for k ∈ 0..jn
      yn ← yn + xn-k · Znk
    for k ∈ 1..jd
      yn ← yn - Zdk · yn-k if jd > 0
    jn ← jn + 1 if jn < Nn - 1
    jd ← jd + 1 if jd < Nd - 1
    yn ←  $\frac{y_n}{Zd_0}$ 
  n ← 0
  return y
```