

Hilbert Transform

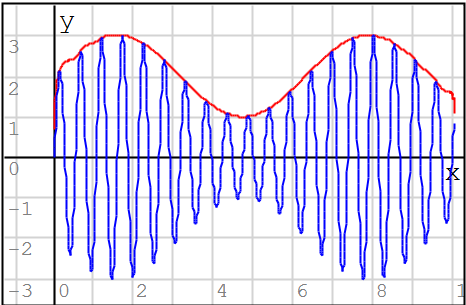
```
HilbertT(X):=
:=
|
m:=rows(X)
ε:=⌊log2(m)⌋+1
m:=eval(m-⌊m/2ε=1/2⌋)
y:=fft(Re(X)/UnitsOf(X),m)
M(n):=|eval(matrix(n,1))
h:=eval(stack(1,2⋅1+M(trunc(m-1/2))),1+M(1-(m-2⋅trunc(m/2))),M(trunc(m-1/2))))
|
ifft(y⋅h,m)
```

```
pR(a,b,n):=|a+b-a/n⋅[0..n]
```

Application: Envelope Detection

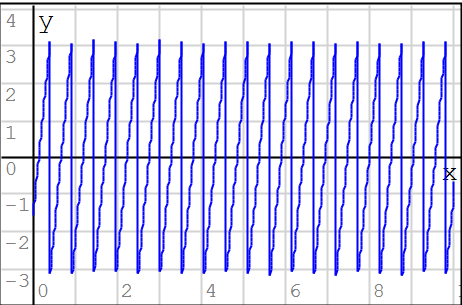
```
Discerte time domain      T:=pR(0 s, 10 s, 1000)
Signal                    S:=(2+sin(1 Hz⋅T))⋅sin(12 Hz⋅T)
Hilbert transform         H:=HilbertT(S)
```

Signal envelope



{augment(T,S)
augment(T,|H|)}

Signal phase



{augment(T,^{arg(H)})}

Alvaro