Therefore

\[ 2p \int_{-\infty}^{\infty} m^2 \frac{1}{2\pi} \sum_{n} \left( \frac{2}{2n\pi} \right) x(2-n) \delta(-x(2-n)) \, dx = \left( 2-t \right) x \]

Now, summarize

\[ 2p \int_{-\infty}^{\infty} (2-t)(2) \, x \, dx = (2)(t) \]

Then \( y \) and \( x \) can be related as:

\[
\begin{pmatrix}
(m \circ H)(m \circ H) \\
(m \circ H)
\end{pmatrix} = \begin{pmatrix}
(m \circ H) x \\
(m \circ H) x
\end{pmatrix} \leftrightarrow \begin{pmatrix}
(t)(x) \\
(t)(x)
\end{pmatrix}
\]

Suppose

\[ 2p \int_{-\infty}^{\infty} (2-t)(2) \, x \, dx = (2)(t) \, y \, x = (t) \, y \]

(Convolutions are applied to non-periodic signals)

(2) (Convolution property)
Conclusion: Convolution in time domain = multiplication in frequency domain.

\[ h(t) * x(t) = \mathcal{F}^{-1} \{ \mathcal{F}(h(t)) \cdot \mathcal{F}(x(t)) \} \]

Remark: The convolution theorem states that the convolution in the time domain is equivalent to the multiplication in the frequency domain. This is a fundamental property in signal processing and system analysis.

\[ h(t) = \mathcal{F}^{-1} \{ H(f) \cdot X(f) \} \]

For example, consider a system with impulse response function \( h(t) \) and input \( x(t) \). The output \( y(t) \) is the convolution of \( h(t) \) and \( x(t) \). It can also be obtained by multiplying their Fourier transforms and applying the inverse Fourier transform.

\[ y(t) = \mathcal{F}^{-1} \{ H(f) \cdot X(f) \} \]

Where \( H(f) \) is the Fourier transform of the impulse response and \( X(f) \) is the Fourier transform of the input signal.
Find the output \( y(t) \).

\[
\begin{align*}
(m(t))_X &= (m(t))_H (m(t))_X \\
&= (m(t))_X \\
&= 0.0 \quad \text{w.r}.
\]

\[
\frac{u(t)}{\sin\, u(t)} = h(t) \\
\Rightarrow h(t) &= \frac{u(t)}{\sin\, u(t)}
\]

Example: \( m(t) = \frac{u(t)}{\sin\, u(t)} \)
$G(t) = \sin \left( \frac{4}{u^4} \right)$

$H(\Delta w)$

$\Omega_0 = \frac{\dot{x}}{u} + x(t)$

$\Delta x = \frac{3}{u^3} \sin \left( \frac{3}{u^3} \right)$

$\Delta t = \sin \left( \frac{4}{u^3} \right)$

Example: $x(t) = (\text{some expression})$
\[ \mathcal{X}(\omega) = \frac{4}{\omega^2} \sin^2 \omega \]

Find \[ x(t) \] of:

\[ X(\omega) = \frac{2}{\omega} \sin \omega \]

\[ X(\omega) = \frac{2}{\omega} \sin \omega \]

\[ x(t) = 0 \]