PREVIOUS WORK

1. Linear Distortion

Given the three signals from section 1 in the document of this section, draw their frequency spectrum.

Compute the value of H (f) at frequencies f_1=2 Hz, f_2=3f_1, f_3=5f_1

Data: transfer function parameters: K_0=1 K_1=0.3, t_0=1 s, t_1=1.7 s

$$H(f) = K_0 e^{-j2\pi f t_0} + K_1 e^{-j2\pi f t_1}$$

2. Nonlinear Distortion

Analytically calculate the output of the function function:

$y(t) = k_1 x(t) + k_2 x^2(t) + k_3 x^3(t)$

being k_1 = 10, k_2 = 4.3 y k_3 = -5.

For

$x(t) = x_1(t)$, where V_1 = 1.5, f_1 = 20.

And for

$x(t) = x_1(t) + x_2(t)$, being V_1 = 1.3, f_1 = 5 Hz and V_2 = 1/2, f_2 = 5 f_1

Note:

$x_1(t) = v_1 \cos(2\pi f_1 t)$
$x_2(t) = v_2 \cos(2\pi f_2 t)$

Note: In the classroom (slides chapter 5), it is solved for the cubic term, missing only the quadratic in this case.

3. Noise

Given the signal $x(t) = x_1(t) + x_2(t)$ with V_1=1.2, V_2=1.5, f_1=5 y f_2=5f_1, draw the signal in the time domain between 0 and T = 0.4.

Note: Draw both signals independently ($x_1(t)$ and $x_2(t)$) and then, add them by taking values between 0 and 0.4 T, for example, the maximum, minimum and zero crossing points.