W6

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Consider the exact solution that is:

Consider the following values for the impedance and an input of 30 volts:

The unit step response looks as follows:

A graph on a white background

AI-generated content may be incorrect.

we can generate Y parameters out of this, consider the bellow table:

|  |  |
| --- | --- |
|  |  |
| 200 π | 1.0000 - 0.0005i |
| 400 π | 1.0000 - 0.0010i |
| 1000 π | 1.0000 - 0.0025i |
| 2000 π | 1.0001 - 0.0050i |
| 10000 π | 1.0014 - 0.0252i |

Using NILTcv to plot both we get.

A graph with blue and red lines

AI-generated content may be incorrect.

With RMSE of 5.3425.

* Now let’s consider 3 Y parameters and combine them.
* First lets change the code for generating the Y parameters :
* Generate Y parameters out of these values:

Consider n=3:

At

Re-write this as:

Then,

clear

clc

% Given the last 3 points

Yr = [0.2485, 0.2166, 0.1546]; % Real part of Y11

Yi = [-0.0195, -0.0848, -0.1210]; % Imaginary part of Y11

w = [1000\*pi, 5000\*pi, 10000\*pi];

A = [];

C = [];

% Loop through each frequency point to construct A and C

for k = 1:length(w)

wk = w(k);

Yr\_k = Yr(k);

Yi\_k = Yi(k);

% Construct rows for A and C

A\_row1 = [-1, Yr\_k, 0, -wk\*Yi\_k, wk^2, -Yr\_k\*wk^2]; % Real part

A\_row2 = [0, Yi\_k, -wk, wk\*Yr\_k, 0, -Yi\_k\*wk^2]; % Imaginary part

% Append to A

A = [A; A\_row1; A\_row2];

% C

C\_row1 = -wk^3 \*Yi\_k ; % Real part

C\_row2 = wk^3 \* Yr\_k; % Imaginary part

% Append to C

C = [C; C\_row1; C\_row2];

end

% Solve for B = [a0; b0; a1; b1]

B = A \ C;

% get cof

a0 = B(1);

b0 = B(2);

a1 = B(3);

b1 = B(4);

a2 = B(5);

b2 = B(6);

f = 0:100:10000;

w = 2\*pi\*f;

s = i\*w;

% generated H

H = (a2\*s.^2+a1\*s+a0)./(s.^3+b2\*s.^2+b1\*s+b0);

plot(f,H)

Moving on to generating Y parameters for the transmission line.