W8

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* Complex frequency

Consider 4 models as follows using AWE\_CHF with M = 6, where

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| w | Poles |
| AWE\_, Y\_W(1:20) | 1.6906 + 0.0000i  -1.1379 + 0.0000i  0.3416 + 0.7967i  0.3416 - 0.7967i  -0.1938 + 0.8052i  -0.1938 - 0.8052i |
| AWE\_, Y\_W(21:30) | -4.1884 + 0.2317i  1.9618 + 3.1320i  -1.3208 - 0.0000i  -0.4097 + 0.0000i  0.2323 + 1.8643i  -0.0000 + 1.1424i |
| AWE\_, Y\_W(31:40) | -0.2437 - 2.3025i  0.5619 + 2.0314i  -0.2437 + 2.3025i  -0.6176 + 1.3746i  0.0937 + 1.4062i  -0.0000 + 1.7136i |
| AWE\_, Y\_W(41:50) | -0.2194 - 2.3773i  -0.2194 + 2.3773i  0.0847 + 2.4142i  0.0792 + 2.1397i  -0.0595 + 2.1806i  0.0000 + 2.2848i |

1. Consider the first 3 model and remove all unstable poles we get:

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| -0.2437 - 2.3025i  -0.2437 + 2.3025i  -0.6176 + 1.3746i  -0.0000 + 1.7136i  -4.1884 + 0.2317i  -1.3208 - 0.0000i  -0.4097 + 0.0000i  -0.0000 + 1.1424i  -1.1379 + 0.0000i  -0.1938 + 0.8052i  -0.1938 - 0.8052i |

Since there is no overlapping, we assume all these poles are valid and dominant.

1. Find the residues,

We first need to determine the moments,

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| --- | --- |
| w | moments |
| AWE\_, Y\_W(1:20) | 1.0874, , ,…. |
| AWE\_, Y\_W(21:30) | -1.1042 - 0.4466i, ,… |
| AWE\_, Y\_W(31:40) | -0.8856 + 0.1380i, |

Using the moments of the first model, generated residues are:

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|  |

All of these residues are close to 0 except for the one highlighted and these are the one associated with the poles from the first model. Hence, the final model is almost the same as the first model. The resultant mode highly depends on the moments’ matrix.

This is not automated and not good implementation ,it’s just to obtain an understanding before automate it.

clear

clc

% Generate frequency points

f = linspace(0, 9e5, 100);

w = 2\*pi\*f;

s = 1i \* w;

M = 6;

t = 50e-6;

first\_idx = 1:20;

vo =1./(cosh(400.\*(0 + 1e-10.\*s).^(1/2).\*(0.1 + 2.5e-7.\*s).^(1/2)));

[H1,num,deno] = generate\_yp2(real(vo(first\_idx)),imag(vo(first\_idx)),w(first\_idx));

[A,B,C,D] = create\_state\_space(num,deno);

[p1c,np1c,r1c,m1c] = AWE\_CFH\_poles(A,B,C,D,M,w(first\_idx(1)));

[p1,np1,r1,m1] = AWE\_poles(A,B,C,D,w(first\_idx(1)));

%second model ----------------------------------------------------------

idx = 21:30;

%H\_diff = vo(idx)-H(s(idx));

[H2,num,deno] = generate\_yp2(real(vo(idx)),imag(vo(idx)),w(idx));

[A,B,C,D] = create\_state\_space(num,deno);

[p2c,np2c,r2c,m2c] = AWE\_CFH\_poles(A,B,C,D,M,w(idx(1)));

[p2,np2,r2,m2] = AWE\_poles(A,B,C,D,w(idx(1)));

% Third model ---------------------------------------------

idx = 31:40;

%H\_diff = vo(idx)-H(s(idx));

%[Hi,num,deno] = generate\_yp2(real(H\_diff),imag(H\_diff),w(idx));

[H3,num,deno] = generate\_yp2(real(vo(idx)),imag(vo(idx)),w(idx));

[A,B,C,D] = create\_state\_space(num,deno);

[p3c,np3c,r3c,m3c] = AWE\_CFH\_poles(A,B,C,D,M,w(idx(1)));

[p3,np3,r3,m3] = AWE\_poles(A,B,C,D,w(idx(1)));

% Forth model ---------------------------------------------------

idx = 41:50;

%H\_diff = vo(idx)-H(s(idx));

%[Hi,num,deno] = generate\_yp2(real(H\_diff),imag(H\_diff),w(idx));

[H4,num,deno] = generate\_yp2(real(vo(idx)),imag(vo(idx)),w(idx));

[A,B,C,D] = create\_state\_space(num,deno);

[p4c,np4c,r4c,m4c] = AWE\_CFH\_poles(A,B,C,D,M,w(idx(1)));

[p4,np4,r4,m4] = AWE\_poles(A,B,C,D,w(idx(1)));

poles\_c = [p1c,p2c,p3c,p4c];% poles from AWE\_CFH with many moments

poles\_nc = [np1c,np2c,np3c,np4c];% shifted poles

poles = [p1,p2,p3,p4]; % AWE with q = lenght(B)

polesn = [np1,np2,np3,np4]; %shifted poles

pt = [p3c',p2c',p1c'];

ptest = 0;

% remove unstable poles

for i=1:length(pt)

if real(pt(i))<0

ptest = [ptest,pt(i)];

end

end

ptest = ptest(2:end);

mtest = m1c; %% moments from the first model has 1 value and zeros

[hs,r]= generate\_hs(ptest,length(ptest),mtest);

%plot(f,hs(s),f,vo,f,H1(s),'r\*');

A graph of a function

AI-generated content may be incorrect.