

## ELEC 341 – Lecture Notes

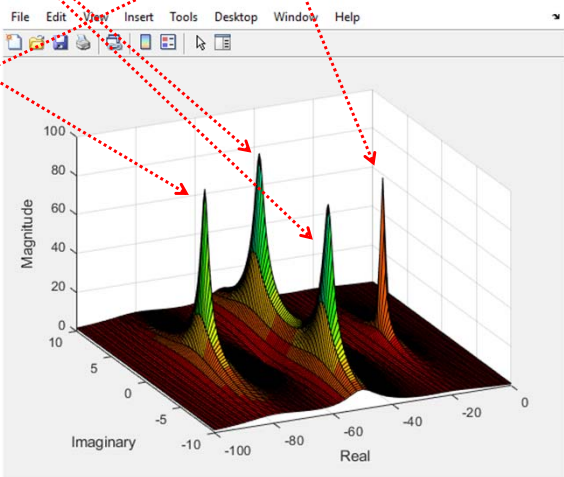
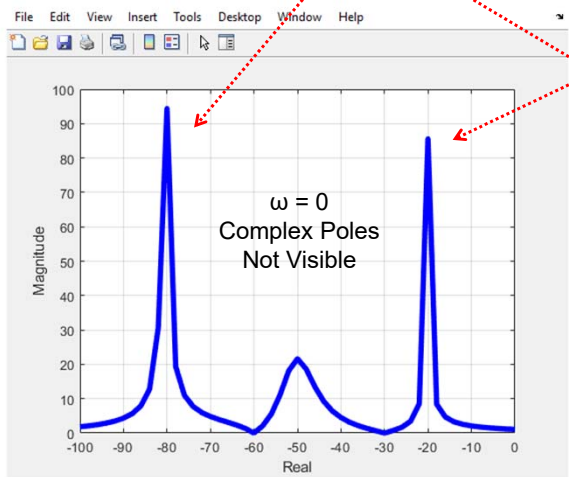
# Poles & Zeros

### Learning Objectives

- Poles
- Zeros
- Real & Complex
- Matlab
  - meshgrid()
  - surf()
  - view()
  - colormap()
    - help graph3d for useful maps

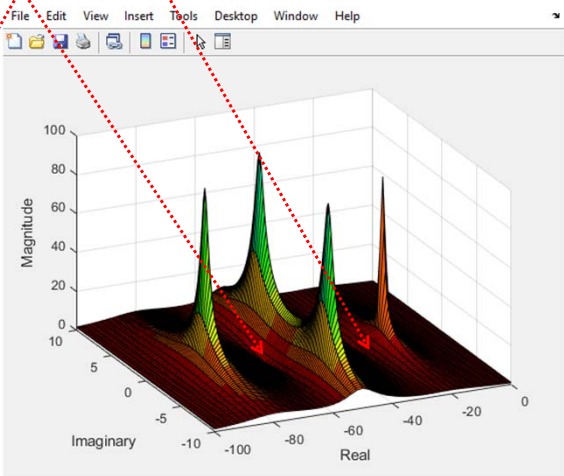
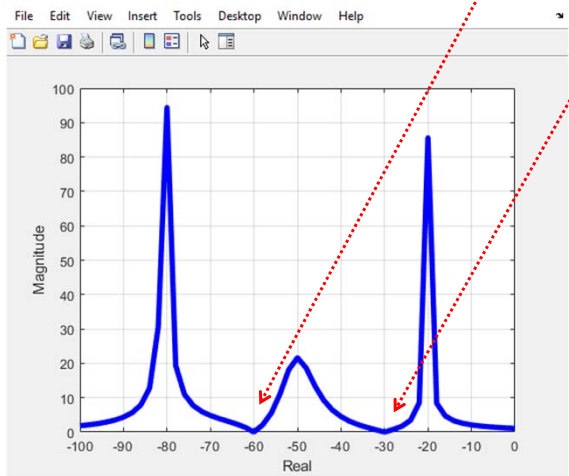
Poles

$$\frac{(s + 60)(s + 30)}{(s + 80)(s^2 + 100s + 2525)(s + 20)}$$



Zeros

$$\frac{(s + 60)(s + 30)}{(s + 80)(s^2 + 100s + 2525)(s + 20)}$$

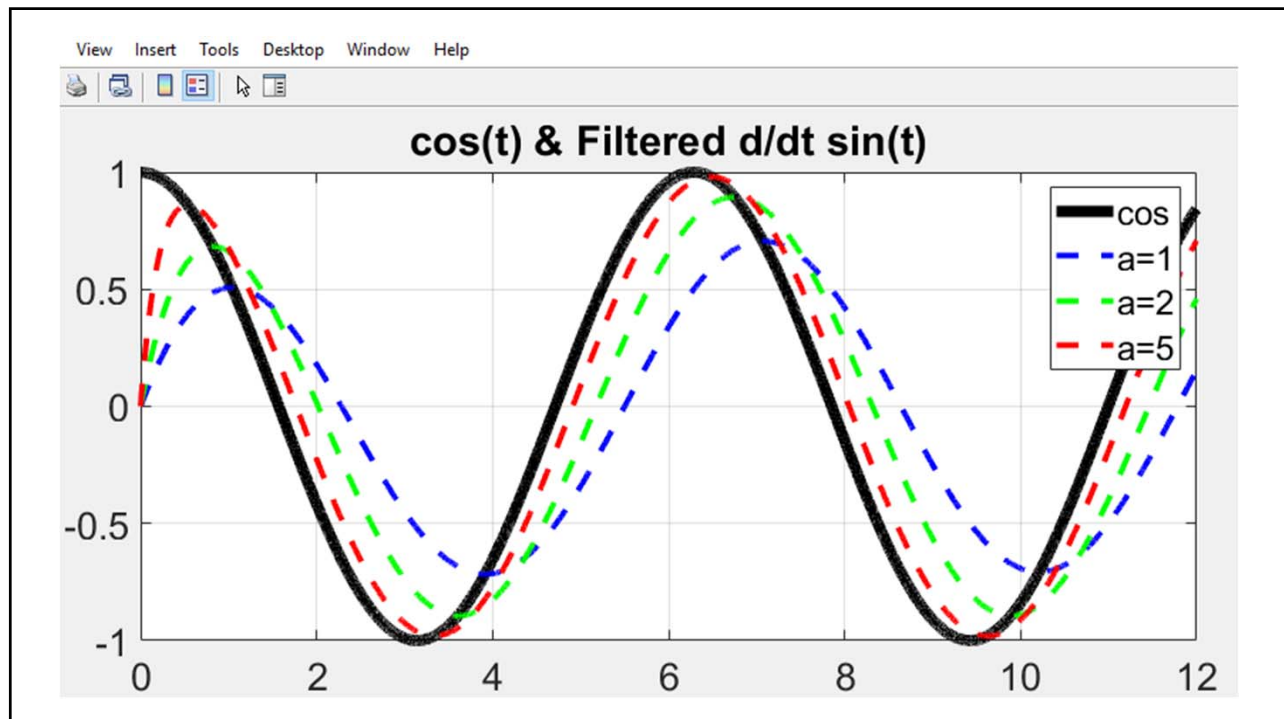


## Approximate Derivatives

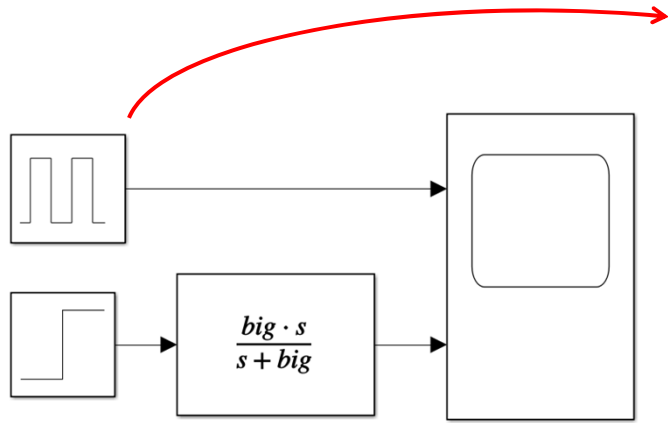
$$\cos(t) \xrightarrow{\mathcal{L}} \frac{s}{s^2 + 1}$$

$$\frac{d}{dt} \sin(t) \xrightarrow{\mathcal{L}} \frac{a}{s+a} s \frac{1}{s^2 + 1} = \frac{as}{(s+a)(s^2 + 1)}$$

filter constant



# Approximate Impulses



Block Parameters: Pulse Generator1

Pulse Generator

Output pulses:

```
if (t >= PhaseDelay) && Pulse is on
    Y(t) = Amplitude
else
    Y(t) = 0
end
```

Pulse type determines the computational technique used.

Time-based is recommended for use with a variable step solver, while Sample-based is recommended for use with a fixed step solver or within a discrete portion of a model using a variable step solver.

Parameters

Pulse type: Time based

Time (t): Use simulation time

Amplitude: big

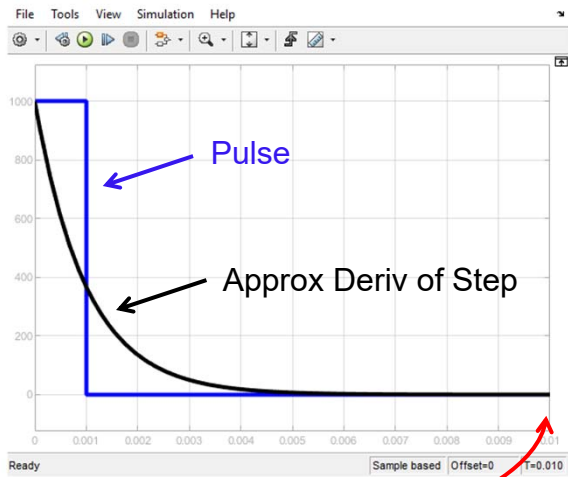
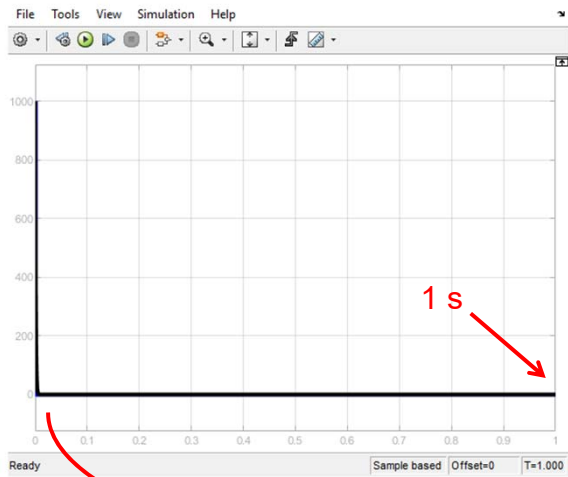
Period (secs): 100

Pulse Width (% of period): 1/big

Phase delay (secs): 0

☒ Interpret vector parameters as 1-D

OK Cancel Help Apply



10 ms