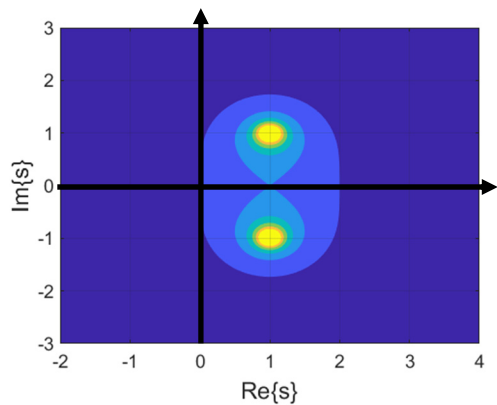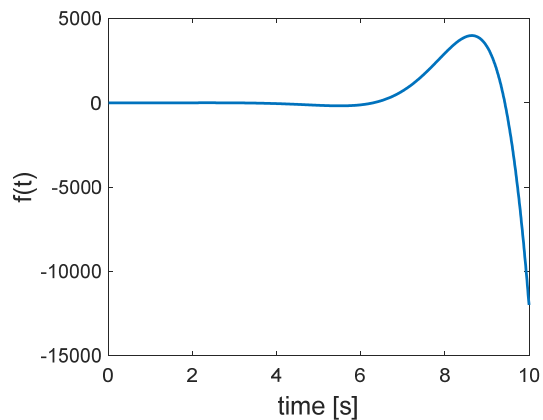# Example Functions

$$f(t) = e^t \sin(t)$$

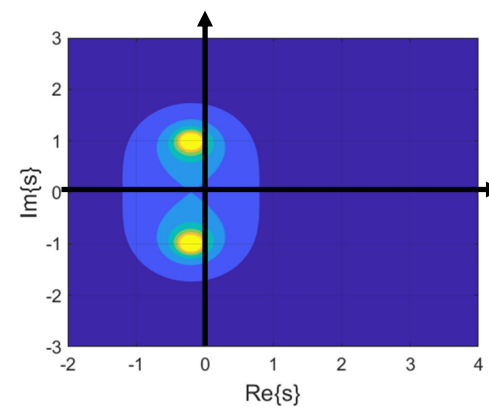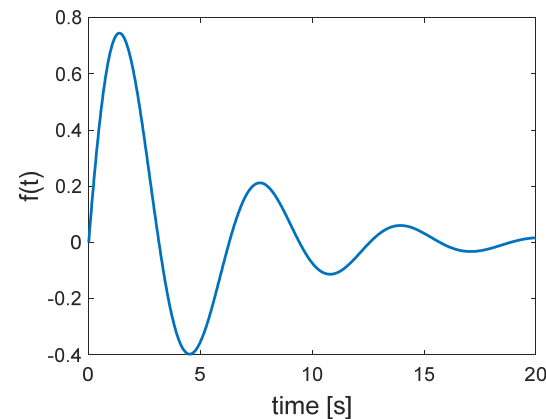$$f(t) = e^{t/10}\sin(t)$$

$$f(t) = e^{-t/5}\sin(t)$$

$$F(s) = \frac{1}{(s-(1+j))(s-(1-j))}$$

$$F(s) = \frac{1}{\left(s-\left(\frac{1}{10}+j\right)\right)\left(s-\left(\frac{1}{10}-j\right)\right)}$$
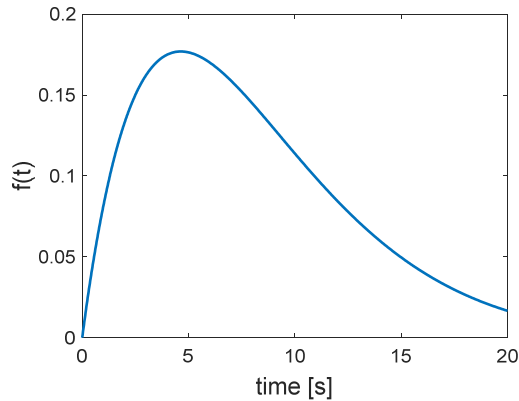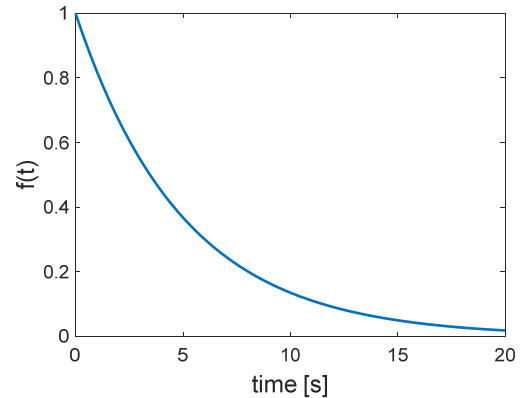
$$F(s) = \frac{1}{\left(s+\left(\frac{1}{5}+j\right)\right)\left(s+\left(\frac{1}{5}-j\right)\right)}$$
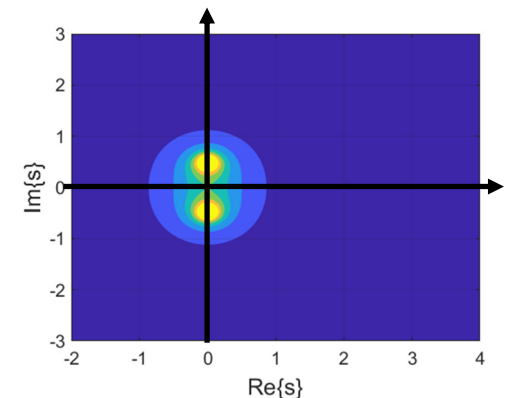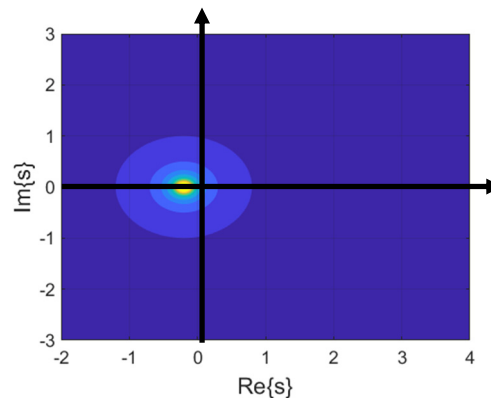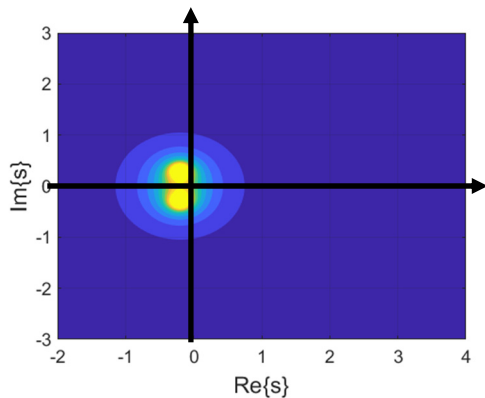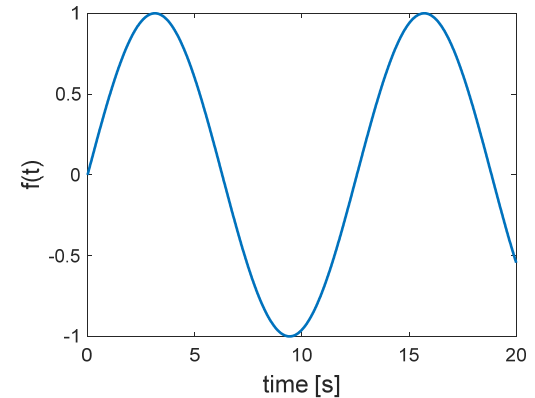
Example Functions

$$f(t) = e^{-t/5}\sin(t/10)$$
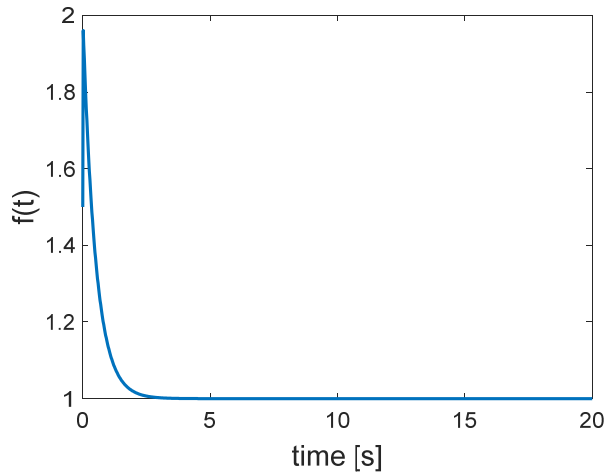
$$f(t) = e^{-t/5}$$

$$f(t) = \sin(t/2)$$

$$F(s) = \frac{1/10}{\left(s + \left(\frac{1}{5} + \frac{j}{10}\right)\right)\left(s + \left(\frac{1}{5} - \frac{j}{10}\right)\right)}$$
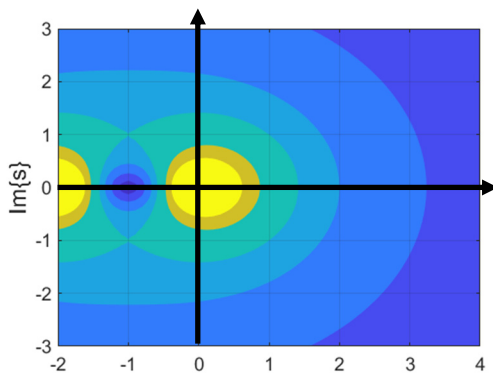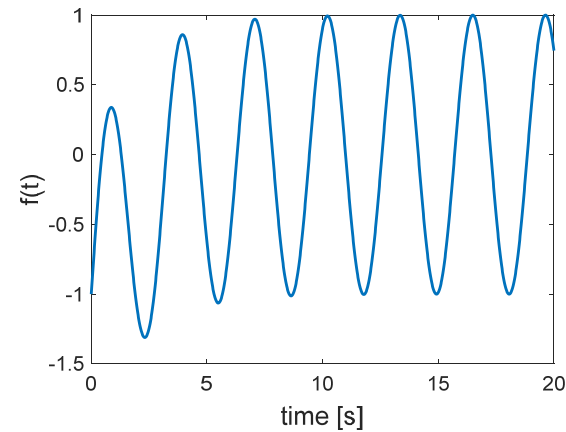
$$F(s) = \frac{1}{\left(s + \frac{1}{5}\right)}$$

$$F(s) = \frac{1/2}{\left(s + \frac{j}{2}\right)\left(s - \frac{j}{2}\right)}$$
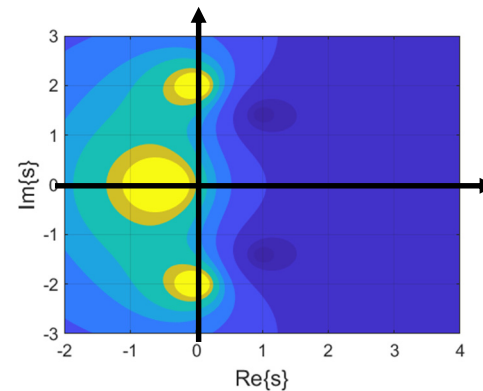
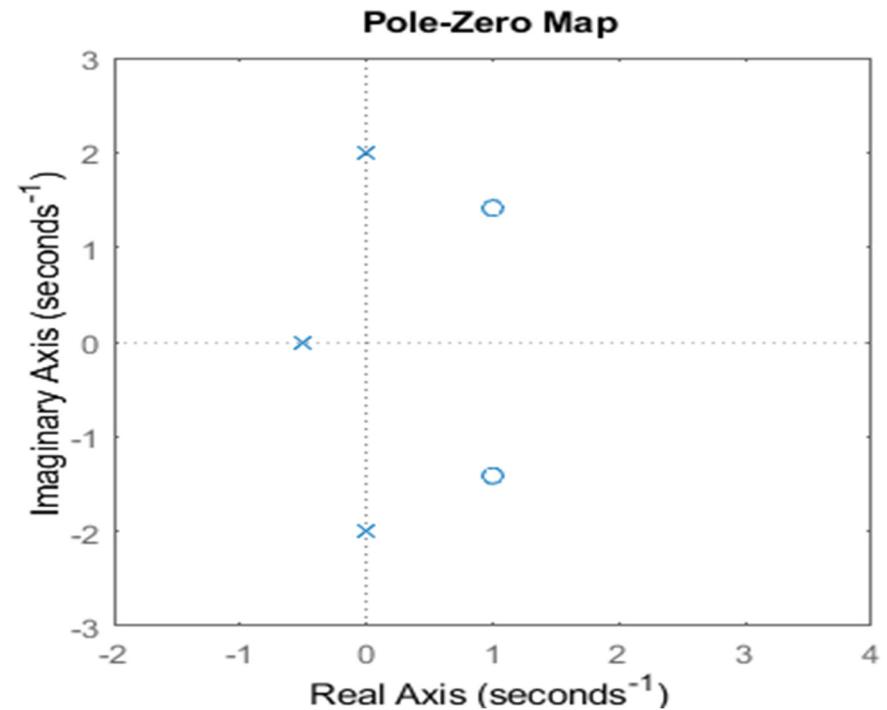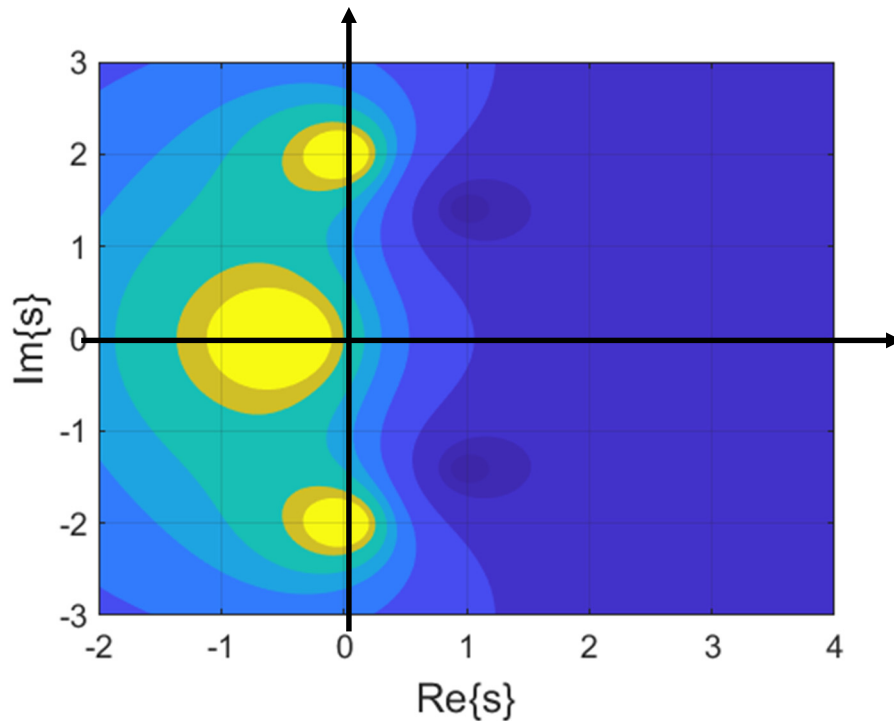# Example Functions

$$f(t) = -e^{-t/2} + u(t)$$

$$F(s) = 2\frac{s+1}{s(s+2)}$$

$$f(t) = -e^{-t/2} + \sin(2t)$$

$$F(s) = -\frac{\left(s + \left(-1 + j\sqrt{2}\right)\right)\left(s + \left(-1 - j\sqrt{2}\right)\right)}{(s + 1/2)(s + j2)(s - j2)}$$

Pole-Zero Map

$$F(s) = -\frac{\left(s + (-1 + j\sqrt{2})\right)\left(s + (-1 - j\sqrt{2})\right)}{(s + {}^1\!/_2)(s + j2)(s - j2)}$$

MATLAB:
```
s = tf('s');
Fs = 2/(s^2 + 4) - 1/(s + 1/2);
pzmap(Fs);
```

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KNOXVILLE

Poles-Zero Plot

System I/O Relationship