

Name _____

Example 1 from p. 68 of text

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

$$p_1 := 0$$

$$p_2 := -2$$

$$H(s) = \frac{k \cdot \frac{1}{s \cdot (s+2)}}{1 + k \cdot \frac{1}{s \cdot (s+2)}} \cdot \frac{s \cdot (s+2)}{s \cdot (s+2)}$$

$$\text{denominator: } s \cdot (s+2) + k = s^2 + 2 \cdot s + k = 0$$

$$s_1(k) := \frac{-2 - \sqrt{2^2 - 4 \cdot k}}{2}$$

$$s_2(k) := \frac{-2 + \sqrt{2^2 - 4 \cdot k}}{2}$$

$$k := 0$$

$$s_1(k) = -2$$

$$s_2(k) = 0$$

$$k := 0.1$$

$$s_1(k) = -1.949$$

$$s_2(k) = -0.051$$

$$k := 0.2$$

$$s_1(k) = \underline{\hspace{2cm}}$$

$$s_2(k) = \underline{\hspace{2cm}}$$

$$k := 0.5$$

$$s_1(k) = -1.707$$

$$s_2(k) = -0.293$$

$$k := 0.8$$

$$s_1(k) = -1.447$$

$$s_2(k) = -0.553$$

$$k := 1$$

$$s_1(k) = -1$$

$$s_2(k) = -1$$

$$k := 2$$

$$s_1(k) = -1 - j$$

$$s_2(k) = -1 + j$$

$$k := 5$$

$$s_1(k) = -1 - 2j$$

$$s_2(k) = -1 + 2j$$

$$k := 10$$

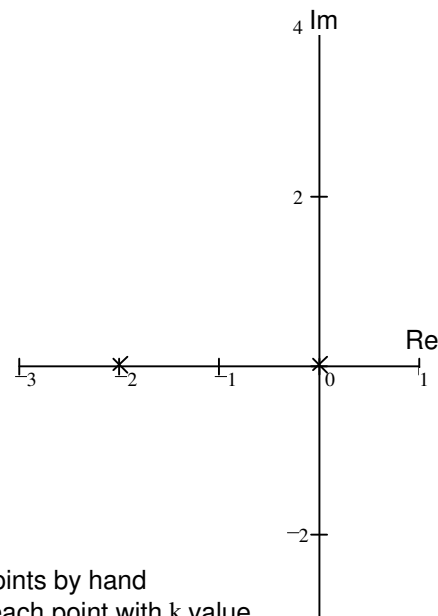
$$s_1(k) = \underline{\hspace{2cm}}$$

$$s_2(k) = \underline{\hspace{2cm}}$$

$$k := 100$$

$$s_1(k) = -1 - 9.95j$$

$$s_2(k) = -1 + 9.95j$$

Plot points by hand
label each point with k value**Example 2 from p. 68 of text**

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

$$z_1 := -1$$

$$p_1 := 0$$

$$p_2 := -2$$

$$H(s) = \frac{k \cdot \frac{s+1}{s \cdot (s+2)}}{1 + k \cdot \frac{s+1}{s \cdot (s+2)}} \cdot \frac{s \cdot (s+2)}{s \cdot (s+2)}$$

$$\text{denominator: } = \underline{\hspace{10cm}} = 0$$

$$s_1(k) := \frac{-(2+k) - \sqrt{(2+k)^2 - 4 \cdot k}}{2}$$

$$s_2(k) := \frac{-(2+k) + \sqrt{(2+k)^2 - 4 \cdot k}}{2}$$

$$k := 0$$

$$s_1(k) = -2$$

$$s_2(k) = 0$$

$$k := 0.1$$

$$s_1(k) = -2.051$$

$$s_2(k) = -0.049$$

$$k := 0.2$$

$$s_1(k) = \underline{\hspace{2cm}}$$

$$s_2(k) = \underline{\hspace{2cm}}$$

$$k := 0.5$$

$$s_1(k) = -2.281$$

$$s_2(k) = -0.219$$

$$k := 0.8$$

$$s_1(k) = -2.477$$

$$s_2(k) = -0.323$$

$$k := 1$$

$$s_1(k) = -2.618$$

$$s_2(k) = -0.382$$

$$k := 2$$

$$s_1(k) = -3.414$$

$$s_2(k) = -0.586$$

$$k := 5$$

$$s_1(k) = -6.193$$

$$s_2(k) = -0.807$$

$$k := 10$$

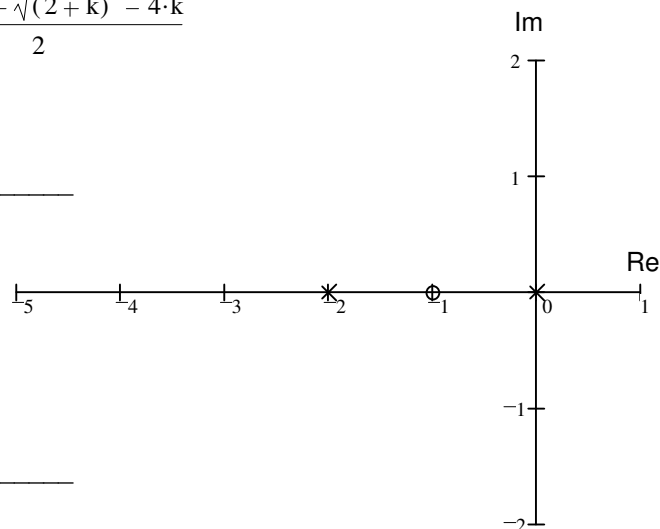
$$s_1(k) = \underline{\hspace{2cm}}$$

$$s_2(k) = \underline{\hspace{2cm}}$$

$$k := 100$$

$$s_1(k) = -101.01$$

$$s_2(k) = -0.99$$



Plot points by hand

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Example 3 from p. 69 of text

$$G(s) = \frac{s+2}{s \cdot (s+1)} \quad \begin{array}{l} z_1 := -2 \\ p_1 := 0 \quad p_2 := -1 \end{array}$$

$$H(s) = \frac{k \cdot (s+2)}{s \cdot (s+1) + k \cdot (s+2)}$$

$$\text{denominator: } s \cdot (s+1) + k \cdot (s+2) = 0$$

$$s^2 + s + k \cdot s + 2 \cdot k = 0$$

$$s^2 + (1+k) \cdot s + 2 \cdot k = 0$$

$$s_1(k) = \underline{\hspace{10em}}$$

$$s_2(k) = \underline{\hspace{10em}}$$

k := 0	s ₁ (k) = -1
k := 0.1	s ₁ (k) = -0.87
k := 0.17157	s ₁ (k) = -0.588
k := 0.172	s ₁ (k) = -0.586 - 0.025j
k := 0.2	s ₁ (k) = -0.6 - 0.2j
k := 0.5	s ₁ (k) = -0.75 - 0.661j
k := 0.8	s ₁ (k) = -0.9 - 0.889j
k := 1	s ₁ (k) = -1 - j
k := 3	s ₁ (k) = -2 - 1.414j
k := 5	s ₁ (k) = -3 - j
k := 5.827	s ₁ (k) = -3.414 - 0.045j
k := 7	s ₁ (k) = -5.414
k := 10	s ₁ (k) = -8.702
k := 100	s ₁ (k) = -98.979

s ₂ (k) = 0
s ₂ (k) = -0.23
s ₂ (k) = -0.584
s ₂ (k) = -0.586 + 0.025j
s ₂ (k) = -0.6 + 0.2j
s ₂ (k) = -0.75 + 0.661j
s ₂ (k) = -0.9 + 0.889j
s ₂ (k) = -1 + j
s ₂ (k) = -2 + 1.414j
s ₂ (k) = -3 + j
s ₂ (k) = -3.414 + 0.045j
s ₂ (k) = -2.586
s ₂ (k) = -2.298
s ₂ (k) = -2.021

Plot points by hand below

