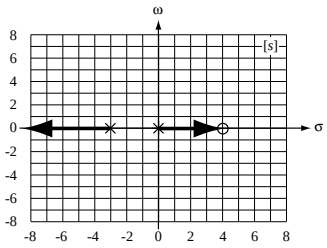
Solution of ECE 316 Test #5 S04

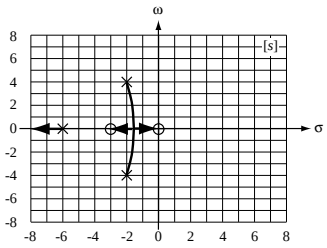
1. Sketch a root locus for each of the following systems.

(a) A feedback system with $H_1(s) = \dfrac{s-4}{s+3}$ and $H_2(s) = \dfrac{1}{s}$.



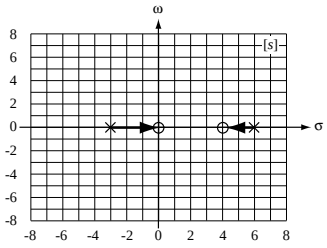
(b) A feedback system with these poles and zeros of $T(s)$.

poles: $s = -6$, $s = -2 + j4$, $s = -2 - j4$
zeros: $s = -3$, $s = 0$



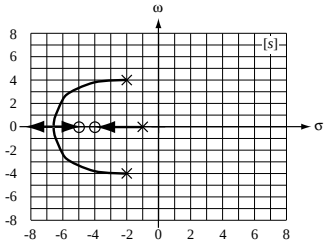
OR

(a) A feedback system with $H_1(s) = \dfrac{s-4}{s+3}$ and $H_2(s) = \dfrac{s}{s-6}$.



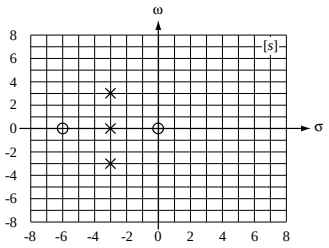
(b) A feedback system with these poles and zeros of $T(s)$.

poles: $s = -1$, $s = -2 + j4$, $s = -2 - j4$
zeros: $s = -5$, $s = -4$

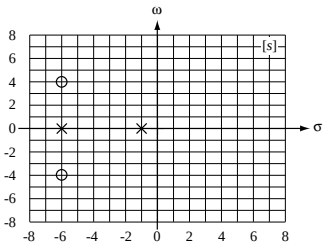


2. Below are some pole-zero plots for the loop transfer functions, $T(s)$, of some systems. Which of these systems are guaranteed to be stable for any positive, finite value of the gain constant, *K*? (Circle correct answer.)

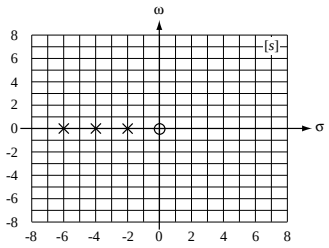
Stable



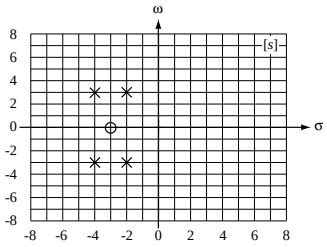
Stable



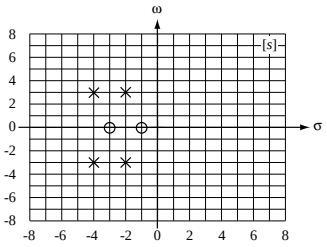
Stable



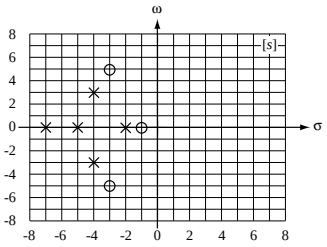
Unstable



Stable

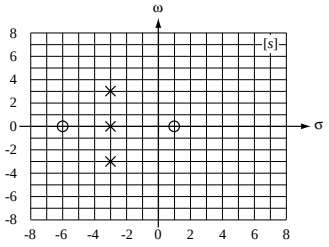


Stable

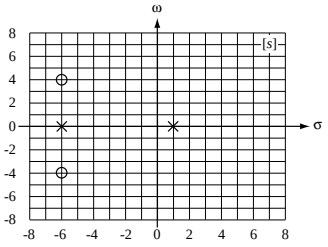


OR

Unstable



Unstable



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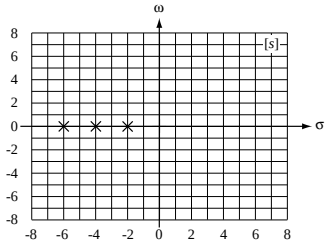

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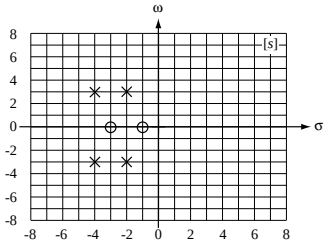
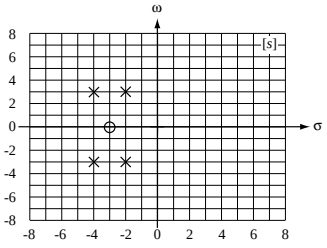


Unstable



Stable