5.8.1.5:

\[ \theta_0 = \frac{(1+2) \times 180^\circ}{P_{ex}} = \frac{90^\circ}{270^\circ} \quad (P_{ex} = 3-1 = 2) \]

\[ \Delta_i = \frac{-4-20+10}{P_{ex}} = \frac{-14}{2} = -7 \]

We have:

\[ \frac{K N(s)}{D(s)} = \frac{10K(s+10)}{s(s+4)(s+20)} \]

The characteristic equation:

\[ \frac{K N(s)}{D(s)} = -1 \implies K = -\frac{D(s)}{N(s)} \]

\[ \frac{dK}{ds} = -\frac{D(s)N(s) - N(s)D(s)}{N^2(s)} = 0 \implies s = -2 \pm 2i \]

In this case, \( D(s)N(s) = N'(s)D(s) \implies s = -2 \pm 2i \)

This is the point where the root locus breaks out.

Then we got the root locus:

[Diagram of root locus with points labeled -2, 0, 4, 10, and -2+2i]