

## Example, continued

Three more rules:

- ▶ Rule D: real locus
- ▶ Rule E: asymptotes
- ▶ Rule F:  $j\omega$ -crossings

Rules D and E are both based on the fact that

$$1 + KL(s) = 0 \text{ for some } K > 0 \iff L(s) < 0$$

Characteristic equation in our example:

$$\underbrace{s(s+2)((s+1)^2+1)}_{a(s)} + K \underbrace{(s+1)}_{b(s)} = 0$$
$$s^4 + 4s^3 + 6s^2 + (4+K)s + K = 0$$

— don't even think about factoring this polynomial!!