

Lecture 24 -- Amplifiers in Feedback

Draw a rough schematic for a typical 3-stage op-amp. What op-amp property is each stage responsible for?

Why does the fact that op-amps are used in feedback mean that we need to be careful about the design of our gain stage?

What is stability?

How can we have observed instability even though our systems so far have been designed with left half-plane poles and no explicit feedback?

Draw a block diagram for an op-amp in feedback.

What is open-loop gain? Closed-loop gain?

What is the closed-loop gain of an op-amp in feedback? The desired gain? The steady state error? For what values of $L(j\omega)$ will our amplifier be guaranteed to be unstable?

What is a root locus, and why do we use root locus techniques?

How is crossover in a Bode plot of the loop gain related to stability?

What is phase margin?

Does an op-amp have greater phase margin when it is configured for unity gain or when it is configured for a gain of A_{cl} ?

What is op-amp compensation? How does it relate to gain-bandwidth product?