ECE 523/421 – Analog Electronics

Lecture 22: Feedback: Introduction

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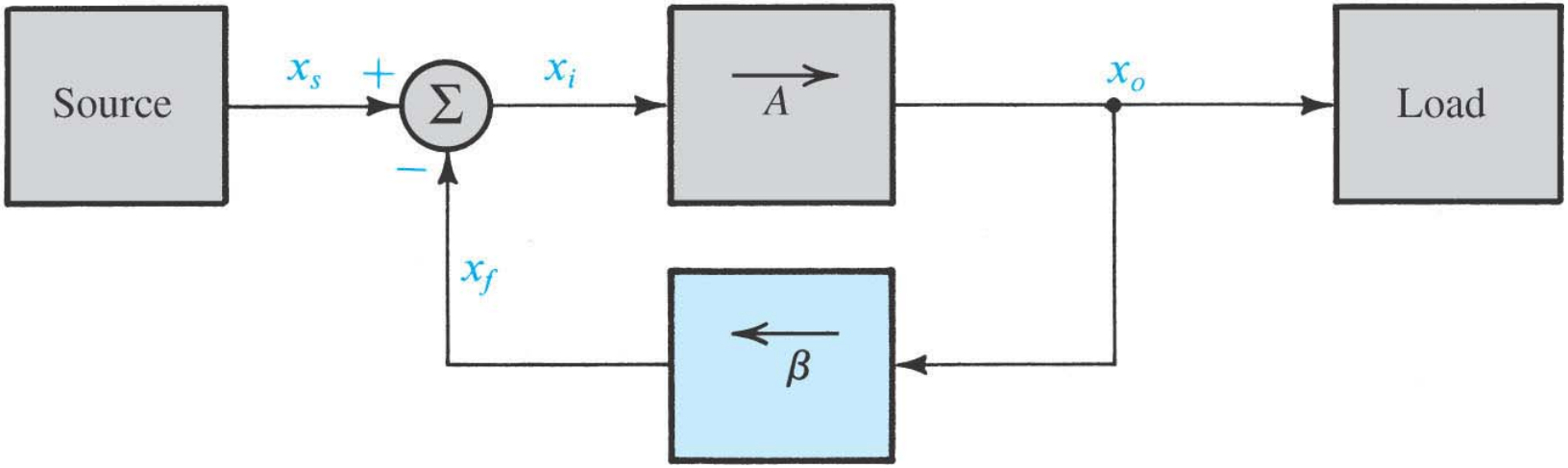
Review of Last Lecture

- Numerical example of low frequency analysis
- High frequency analysis of CC-CE wideband amplifier
- High frequency analysis of CMOS Op Amp

Today's Lecture

- **Feedback and Signal Flow Diagram**
- **Basic Properties of Negative Feedback**

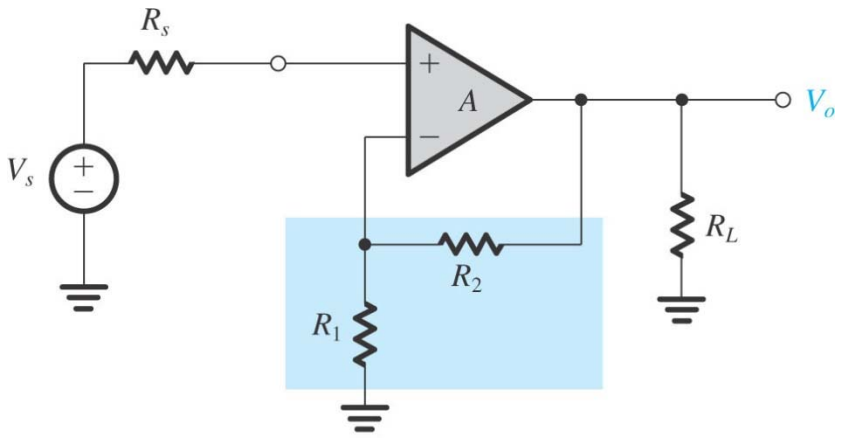
Signal Flow Diagram in Circuits with Feedback



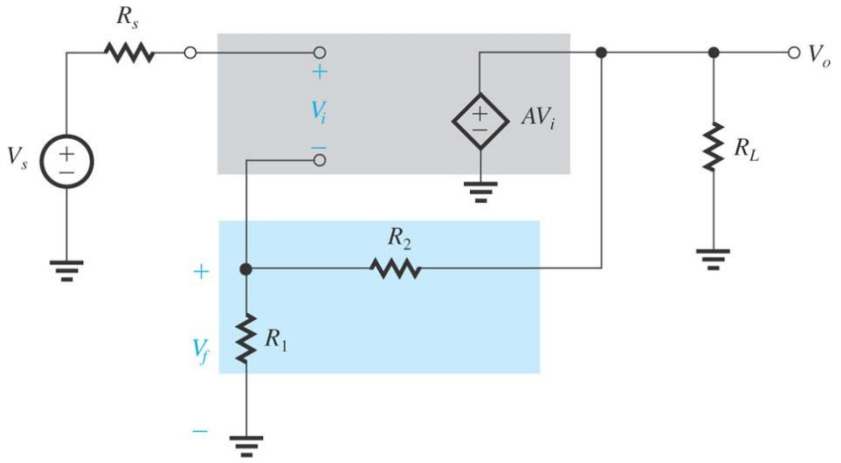
$$A_f = \frac{A}{1 + A\beta}$$

$$A\beta = Loop\ \ Gain$$

A Feedback Example



(a)



(b)

Some Properties of Negative Feedback

- **Desensitize the gain**
- **Reduce nonlinear distortion**
- **Reduce the effect of noise**
- **Control R_{in} and R_{out}**
- **Extend the bandwidth**