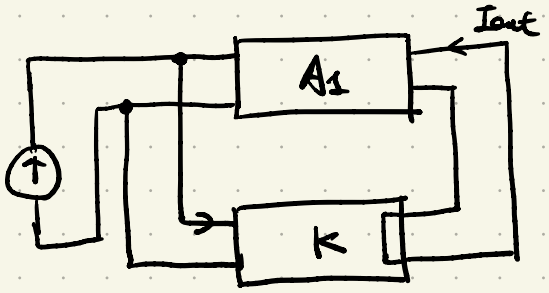
Lec 40

- Current - Current Feedback
- Applications of Feedback in Power Management
- Problems of Loading in feedback Circuits

- Current - Current Feedback



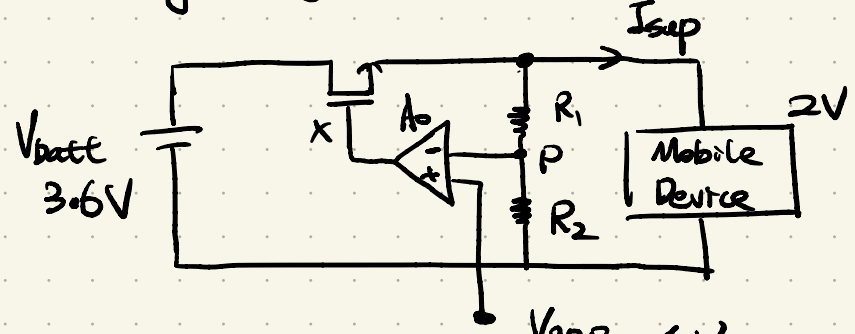
$$\frac{I_{out}}{I_{in}} = \frac{A_1}{1 + kA_1}$$

$$\text{Closed-Loop Input Imp.} = \frac{R_{in}}{1 + kA_1}$$

$$\text{Closed-Loop Output Imp.} = R_{out}(1 + kA_1)$$

Applications of Feedback in Power Management

① Voltage Regulators



Isup: 10mA — 100mA

(Servo loop)

Vsup wants to drop

⇒ Up ↓ Vx ↑ VGS ↑

MOS device can operate in

(a) triode region (as a voltage-controlled resistor)

(b) saturation region (as a source follower)

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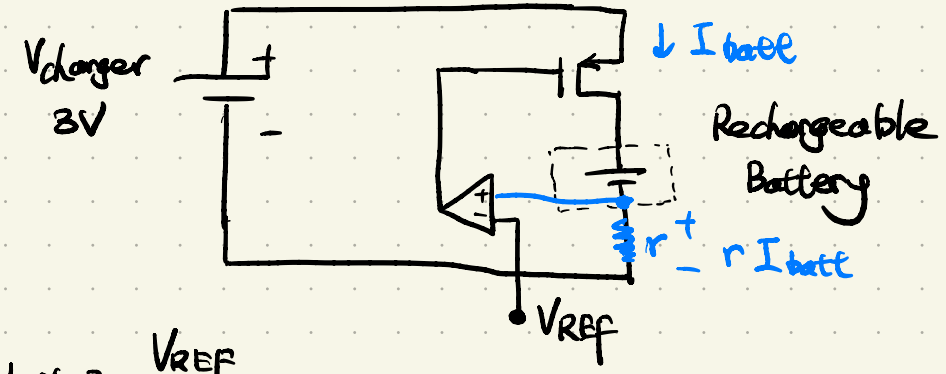
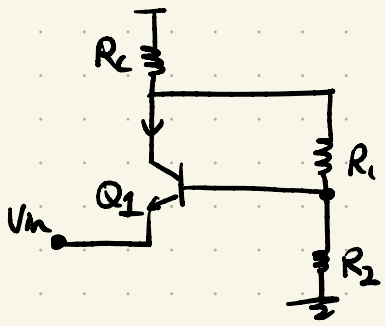
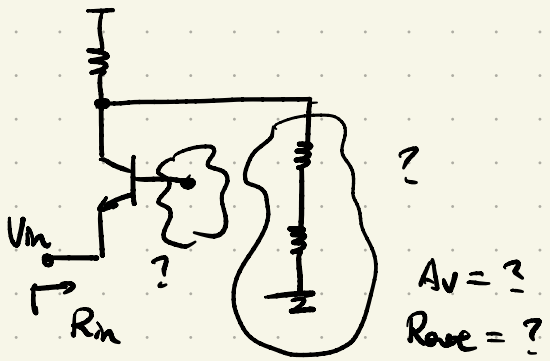
② Current Regulator

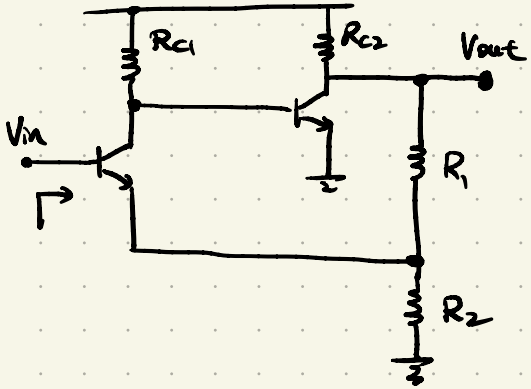


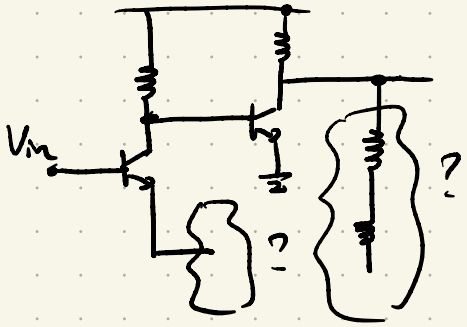
$$I_{batt} = \frac{V_{REF}}{r}$$

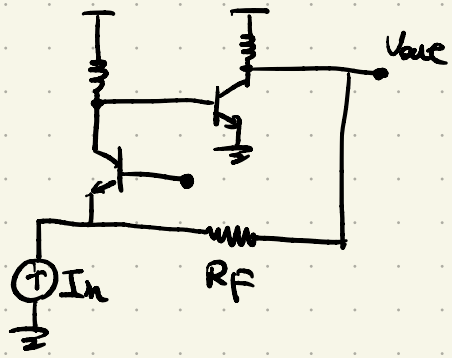
Problem of Loading in Feedback Circuits

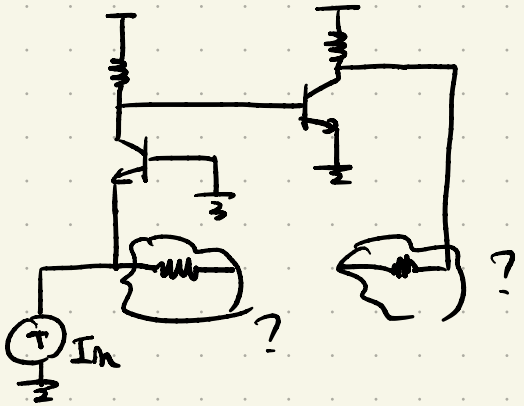


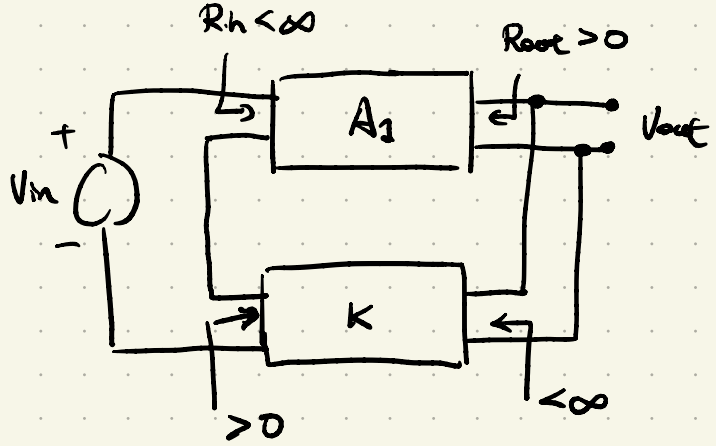




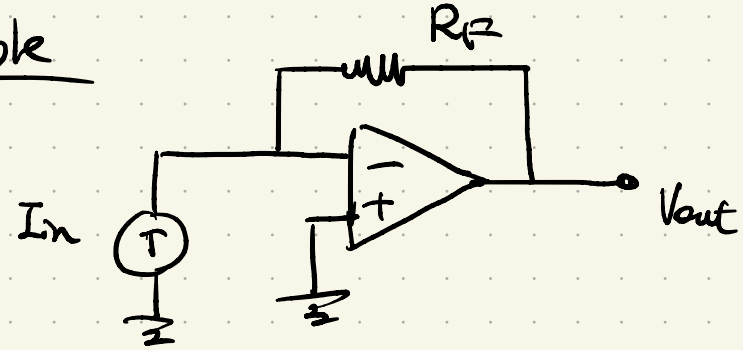


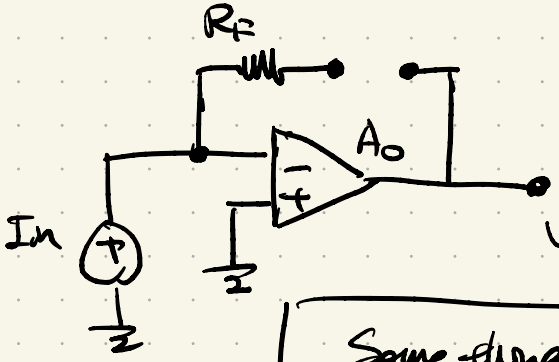






Example





Some-thing will go wrong if we want to find Open-Loop parameters