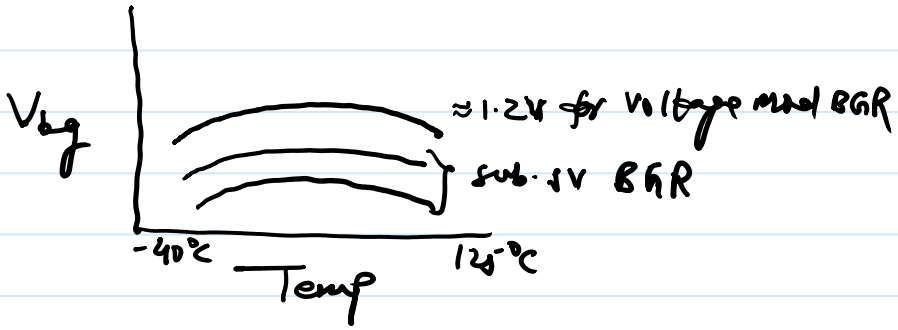
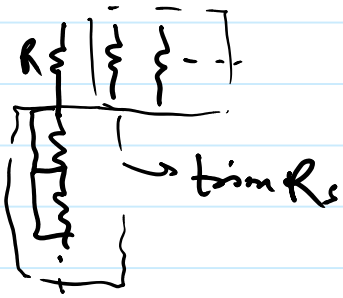
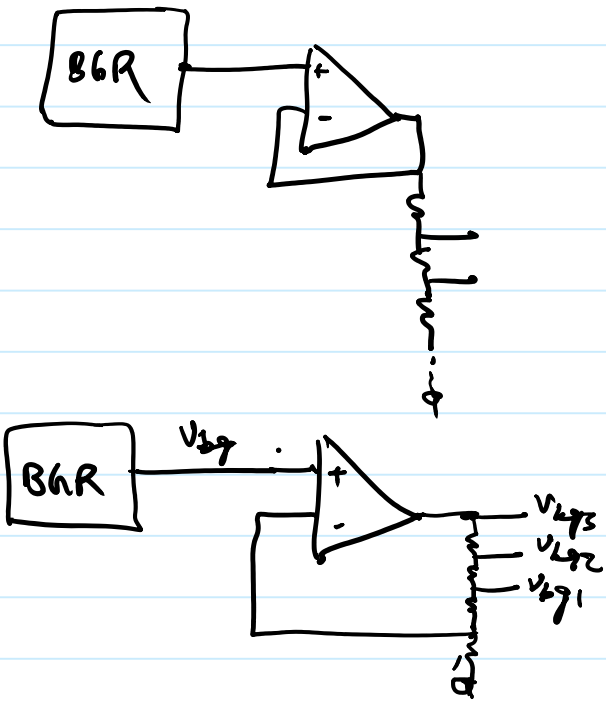
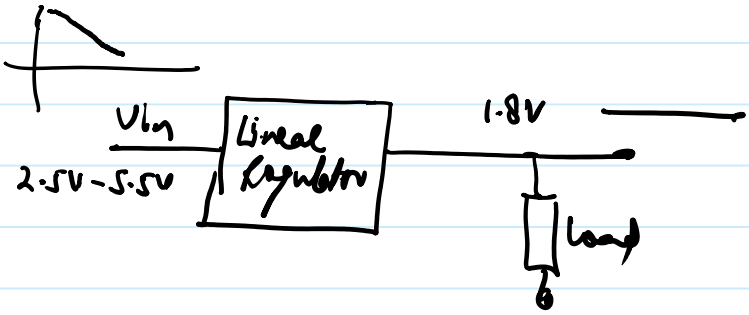
Bandgap Reference

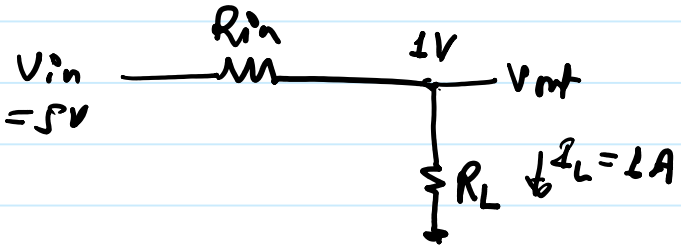






Continuous time circuit which regulates output voltage.



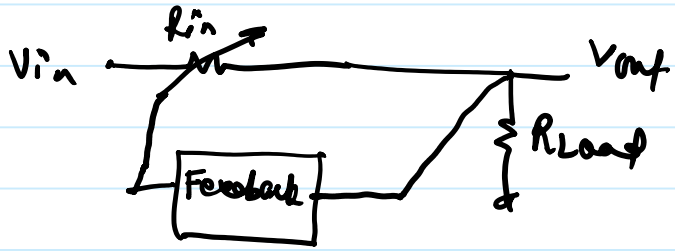


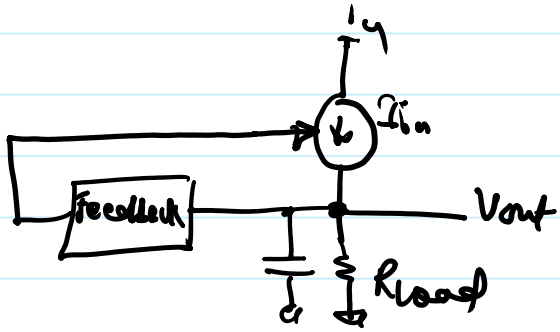
Vout = 4V

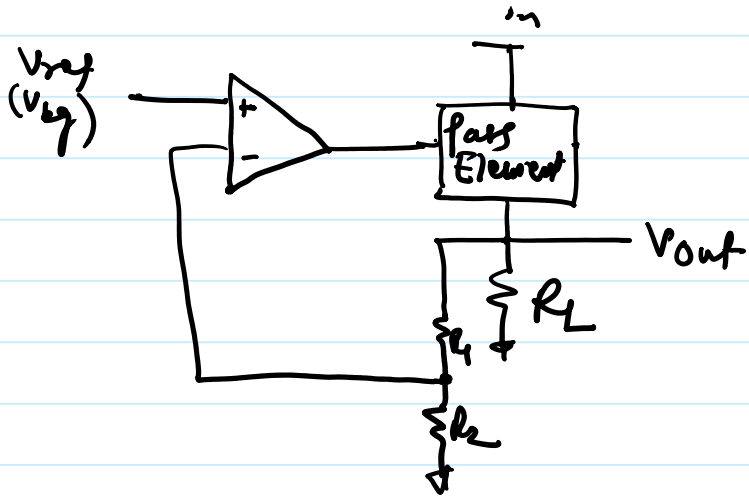
Rin = 1Ω

for fixed output and varying Vin & Iload Rin must be changed.

Controlling Input Resistance and Current

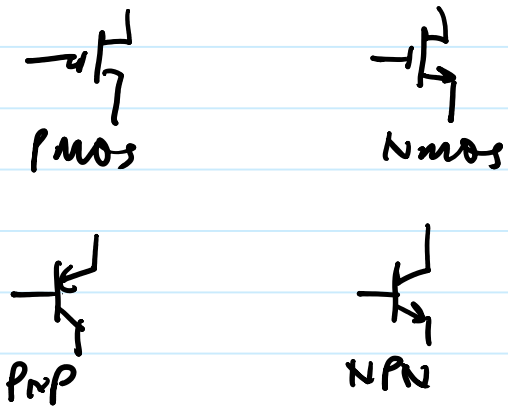


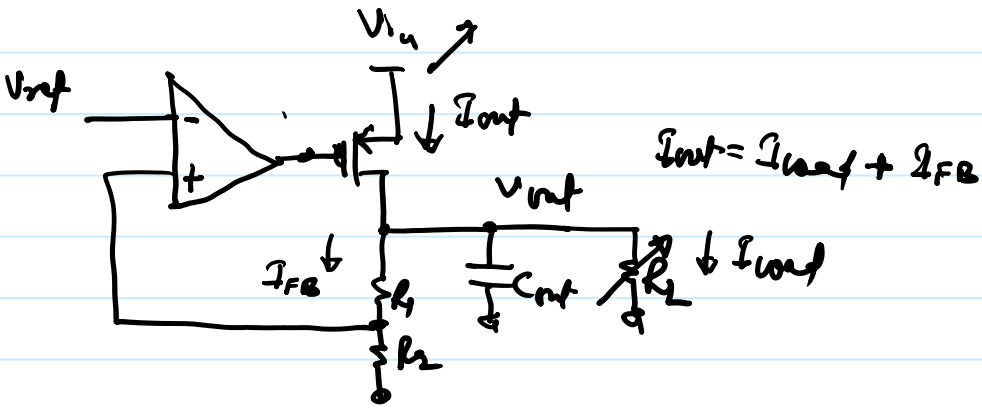


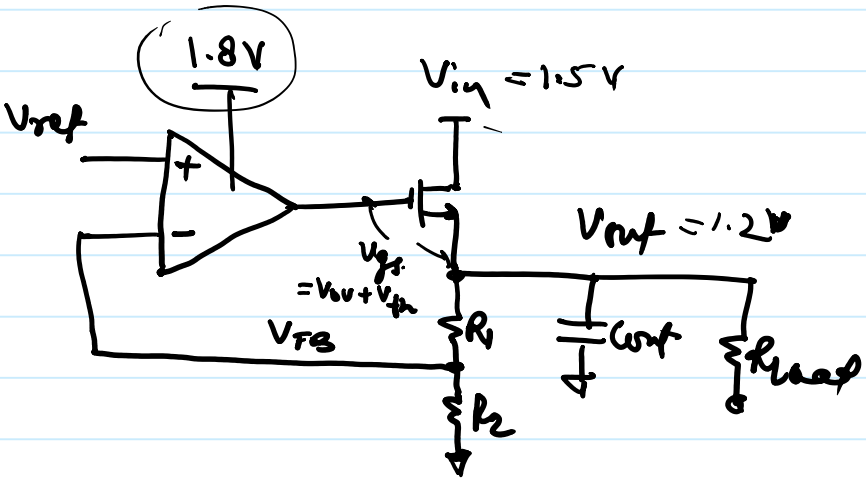


$$V_{out} = \left(1 + \frac{R_1}{R_2}\right) V_{ref}$$

Implementing Pass Element







Low Drop-Out (LDO) Regulator

LDO is linear regulator with low dropout voltage

$$V_{drop} = V_{in} - V_{out}$$

LDOs → $V_{drop} < 10\%$ of V_{in}

$$\eta = \frac{P_{out}}{P_{in}} = \frac{V_{out}}{V_{in}} = \frac{V_{in} - V_{drop}}{V_{in}}$$

$$= 1 - \frac{V_{drop}}{V_{in}}$$