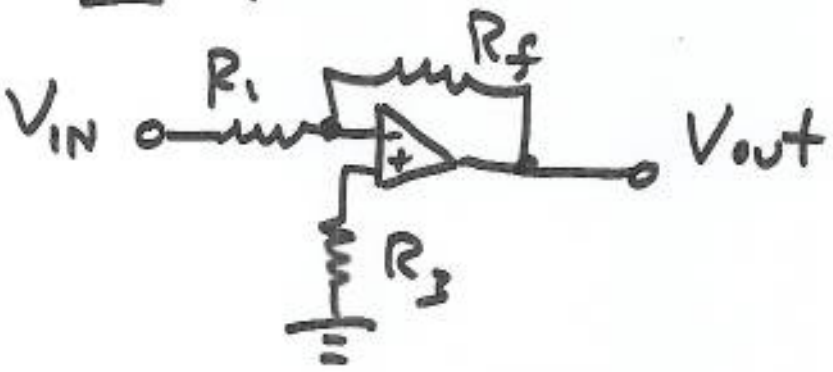
PHYS 4211

T. COAN

Ex. 4.6 p. 210



① $G = -100 = -R_f/R_1$. CHOOSE $R_1 = 10\,k\Omega$

$R_f = 1\,M\Omega$

OTHER CHOICES ok.

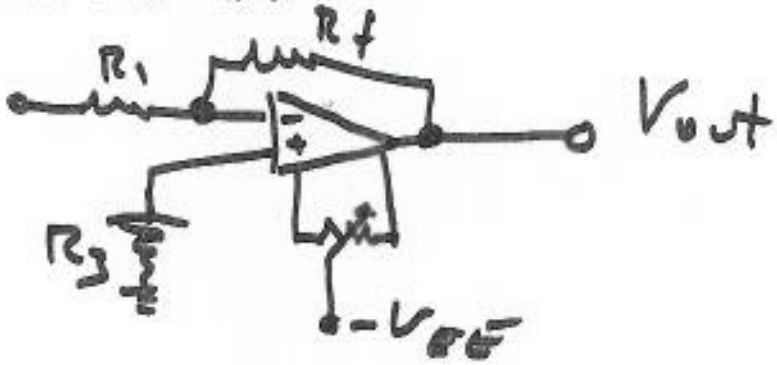
②

INPUT BIAS CURRENT COMPENSATION:

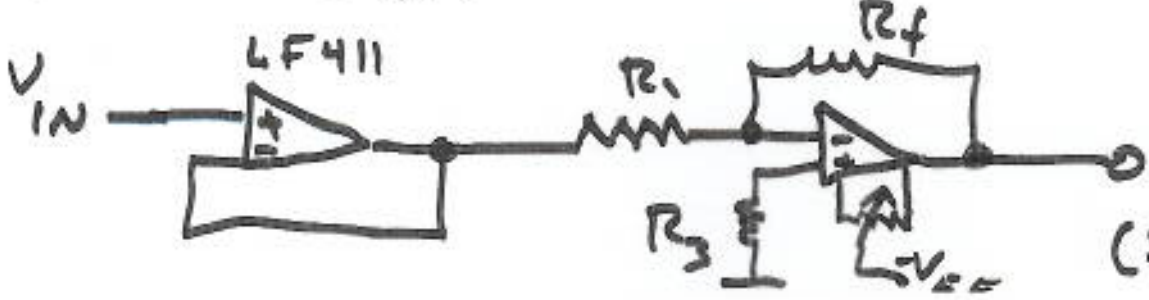
SET $R_3 = R_1 \| R_f \simeq 10\,k\Omega$ (SEE LAB MANUAL P. 141 ff.)

③

OFFSET TRIMMING:



④ HIGH Z_{IN}:



(SEE P190, H.8H)

FIG 4.43.

FIRSTLY, $V_+ = 10V$, BY DIVIDER.

FOR $V_- < V_+$, OP-AMP OUT $= A(V_+ - V_-)$
SO OP-AMP SATURATES AT $\sim +V_{cc}$.
THIS BACK BIASES DIODE (I.E., TURNS DIODE OFF). HENCE $V_{OUT} = V_{IN}$.
WE IGNORE SMALL VOLTAGE DROP ACROSS 2k RESISTOR.

FOR $V_- > V_+ (=10V)$, OP-AMP OUT $= A(V_+ - V_-)$
SO OP-AMP TENDS TO GO NEGATIVE.
BUT THIS FORWARD BIASES DIODE, TURNING ON NEGATIVE FEEDBACK.

FROM ONE OF THE GOLDEN RULES,

$$V_- (= V_{OUT}) = V_+ (= 10V)$$

$$\therefore \quad V_{OUT} = +10V$$

TO CHANGE OUTPUT TO +8V,
CHANGE $V_{cc} \rightarrow +12V$.