

Lecture 32

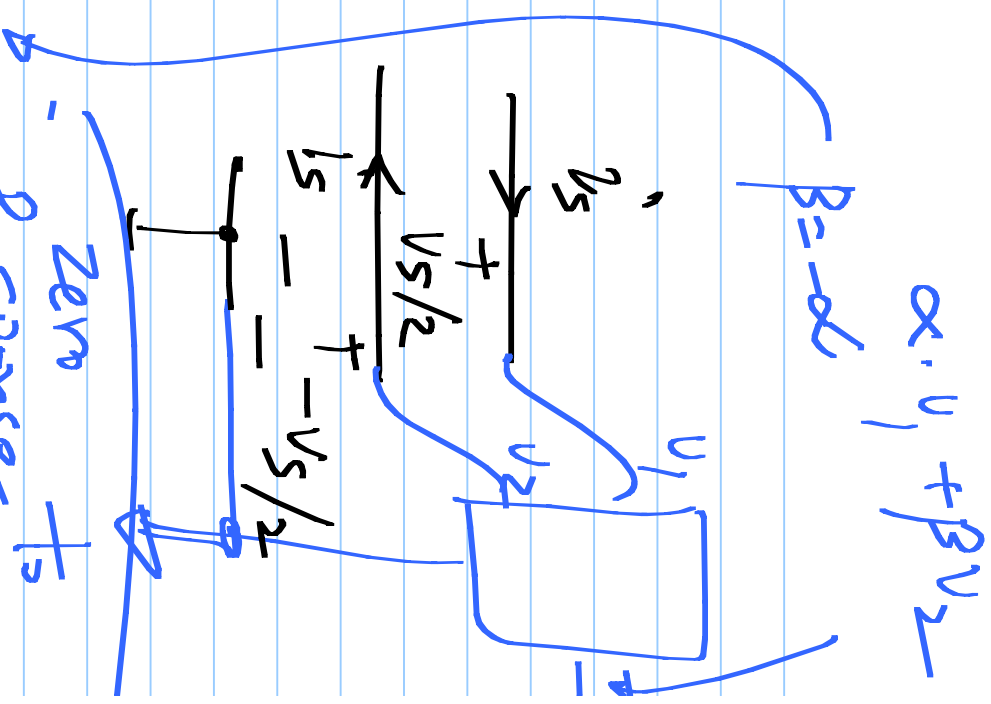
22/3/2016

Fully differential signals

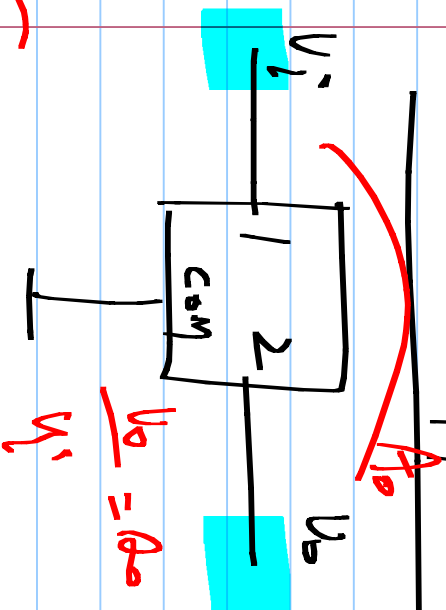
- * 2 wires for each signal
- * signal = difference
- * common mode (average) = 0

Fully differential circuit:-

- * ∞ common mode rejection

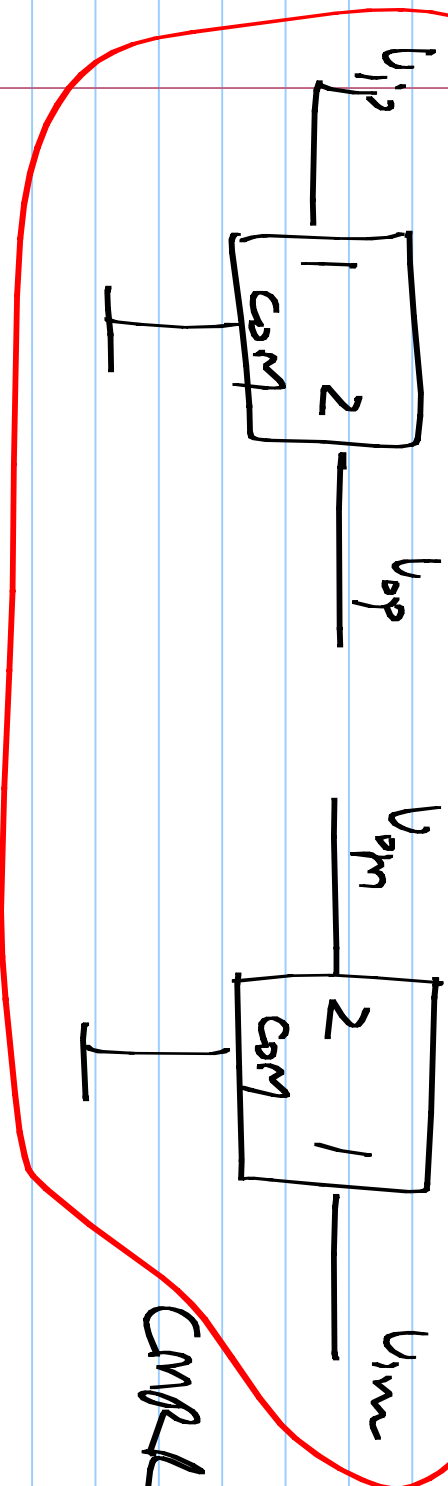


Pseudo differential circuit:-

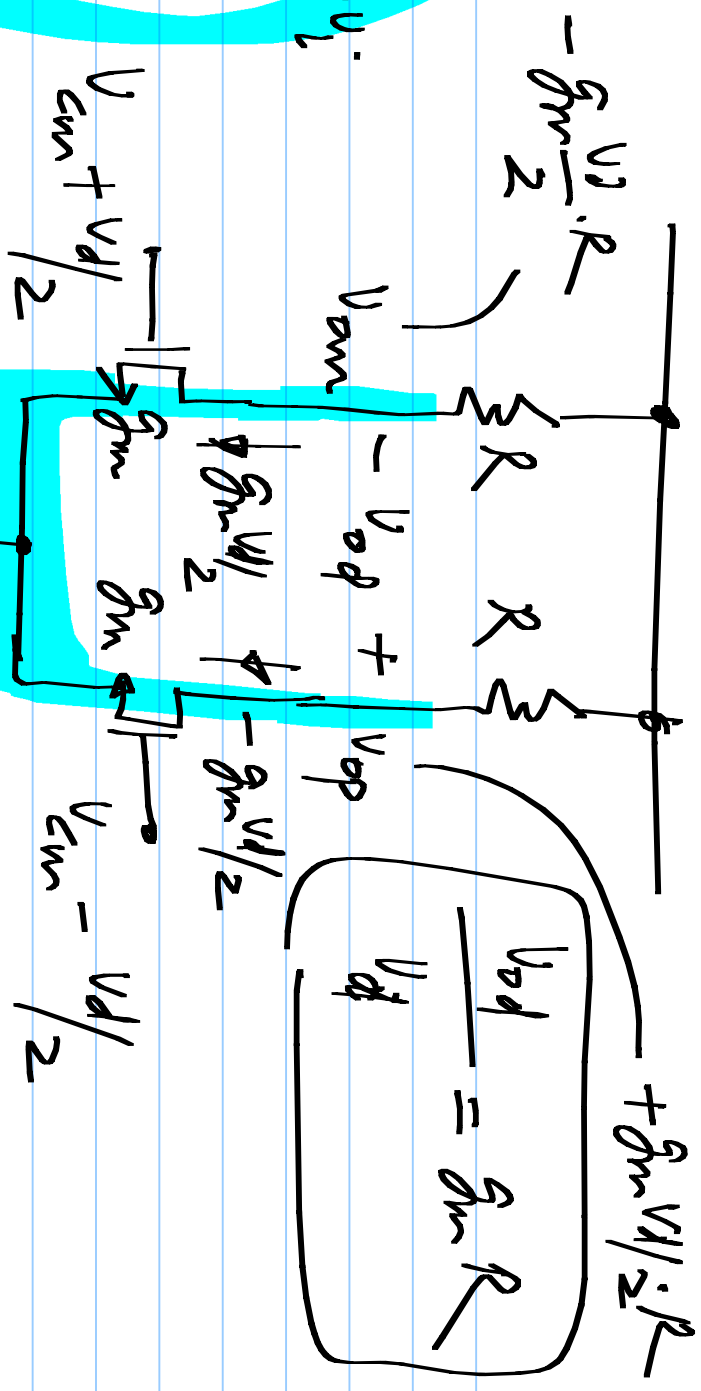
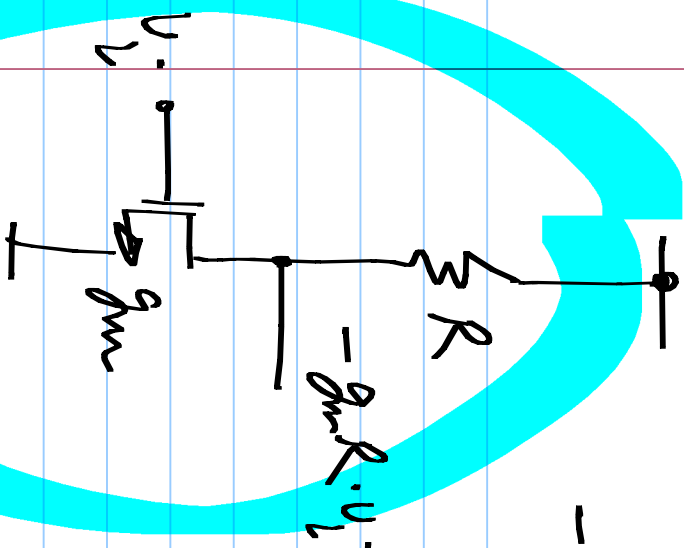


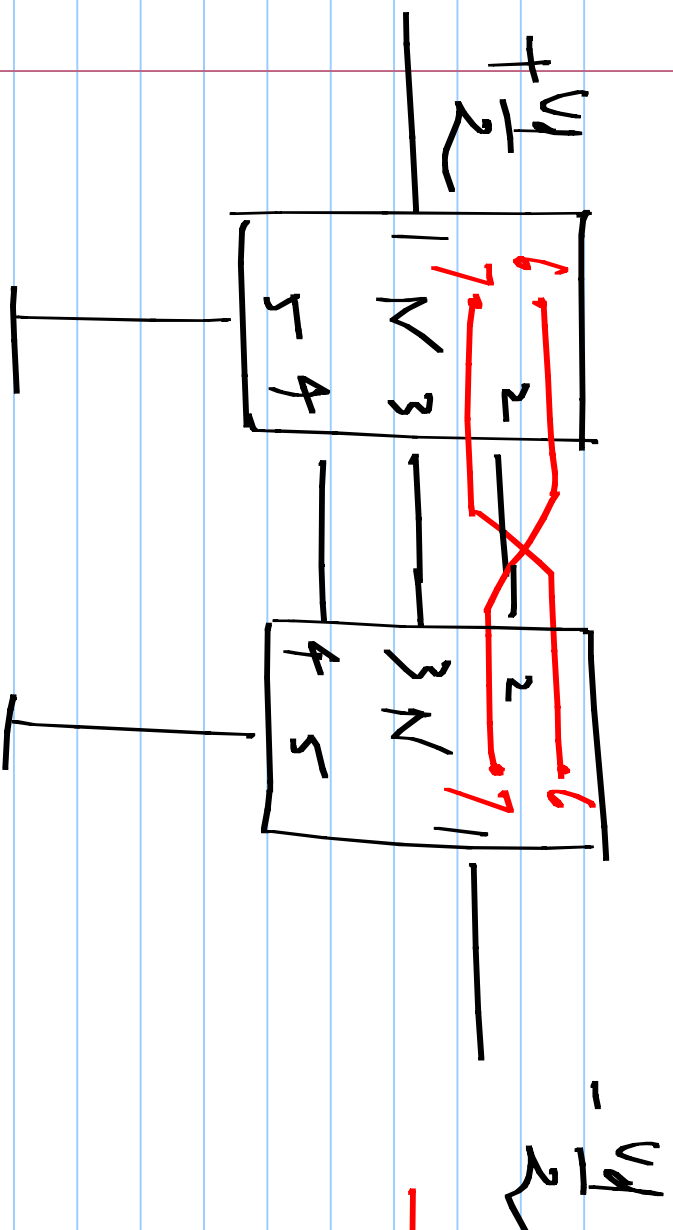
Differential gain: $\frac{v_{op} - v_{on}}{v_i - v_{im}} = A_d$

Common mode gain: $\frac{(v_{op} + v_{on})/2}{(v_i + v_{im})/2} = A_{cm}$

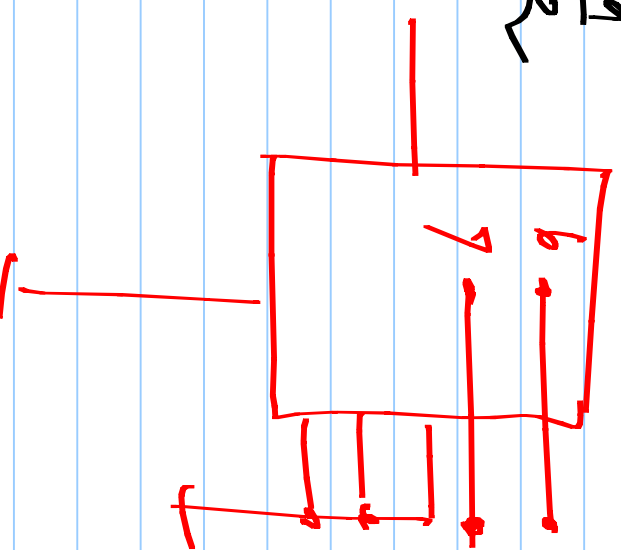


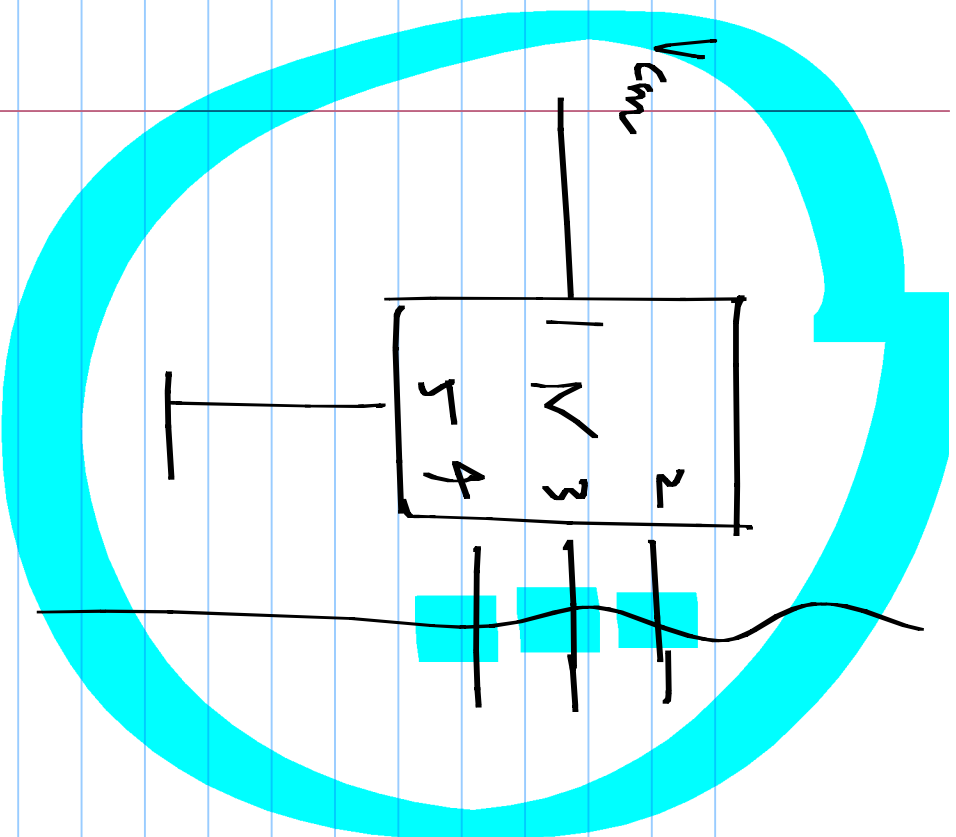
$CMRR = \frac{A_d}{A_{cm}}$



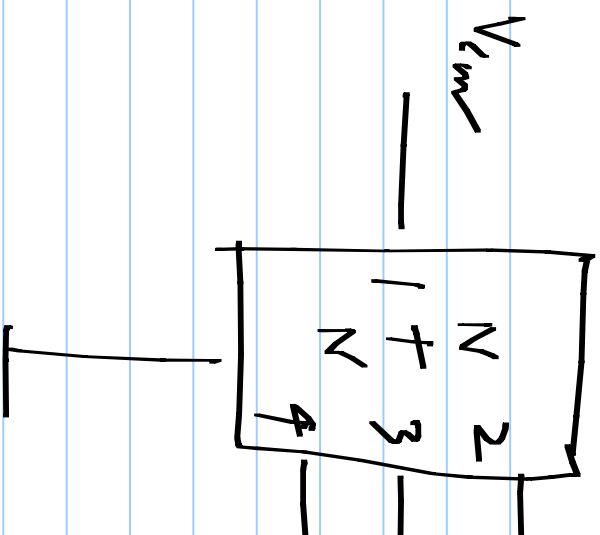


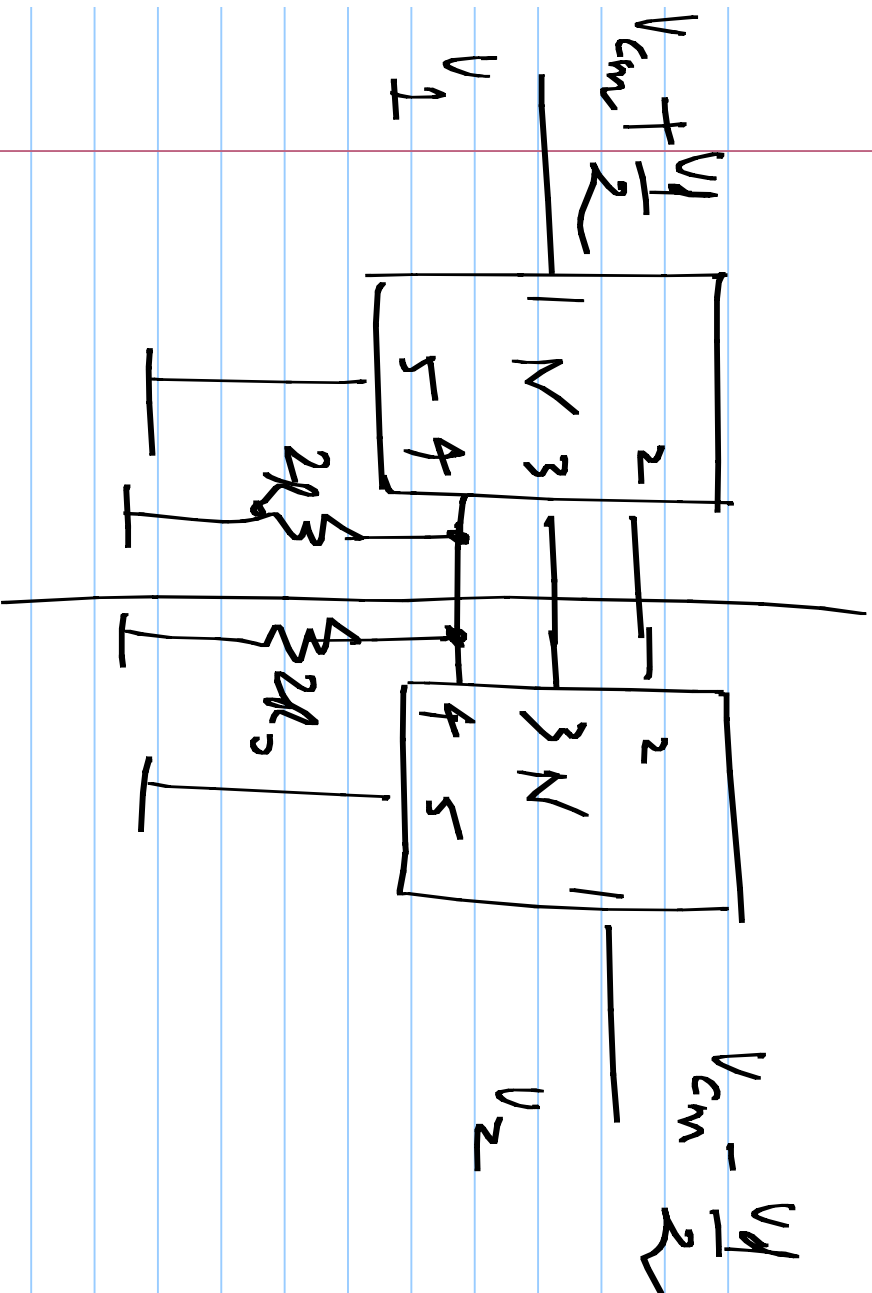
$$V_7 = -V_6$$

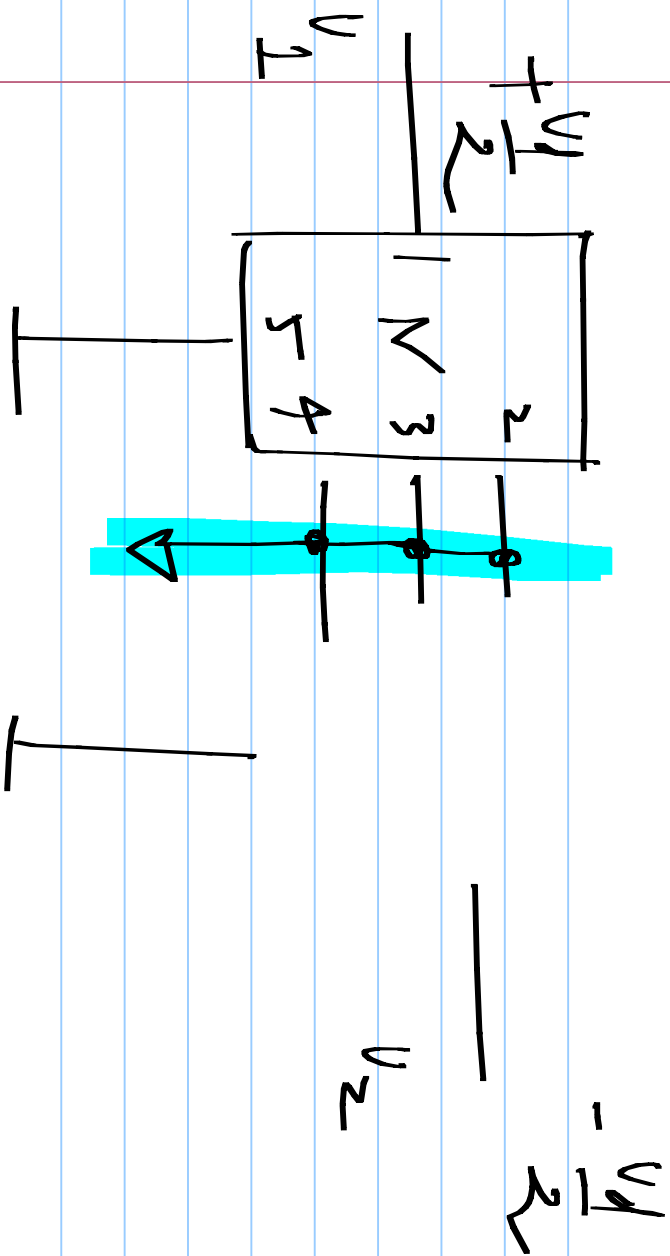


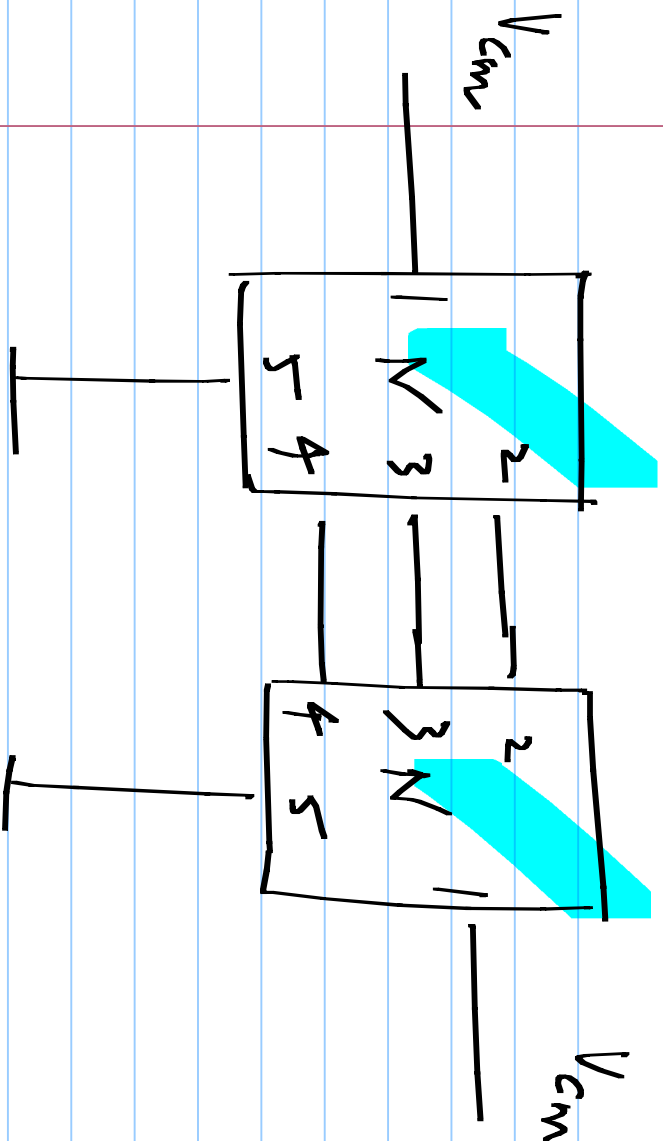


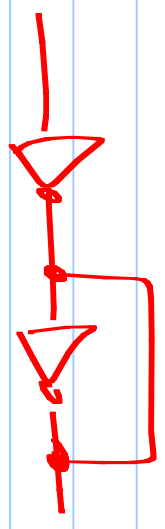
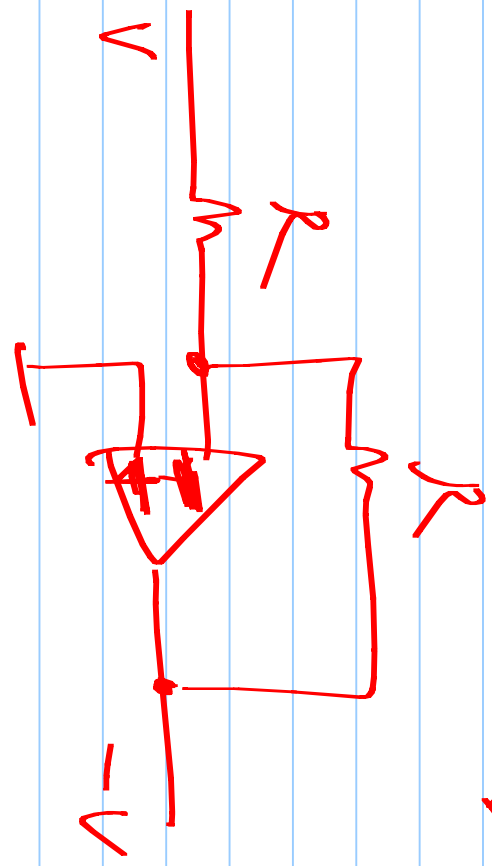
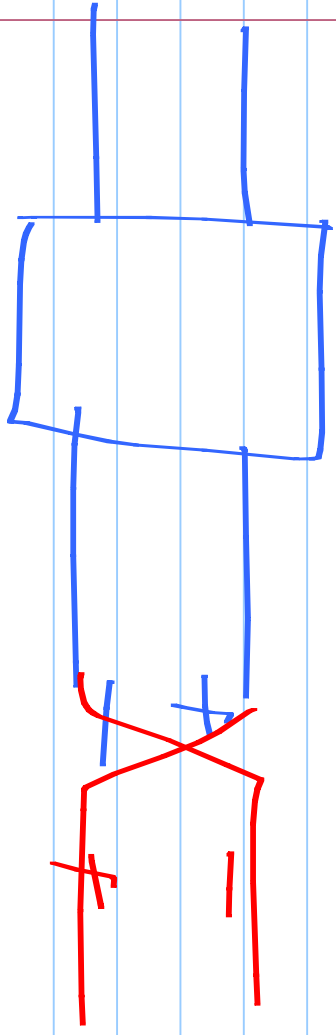
CE eq. circuit

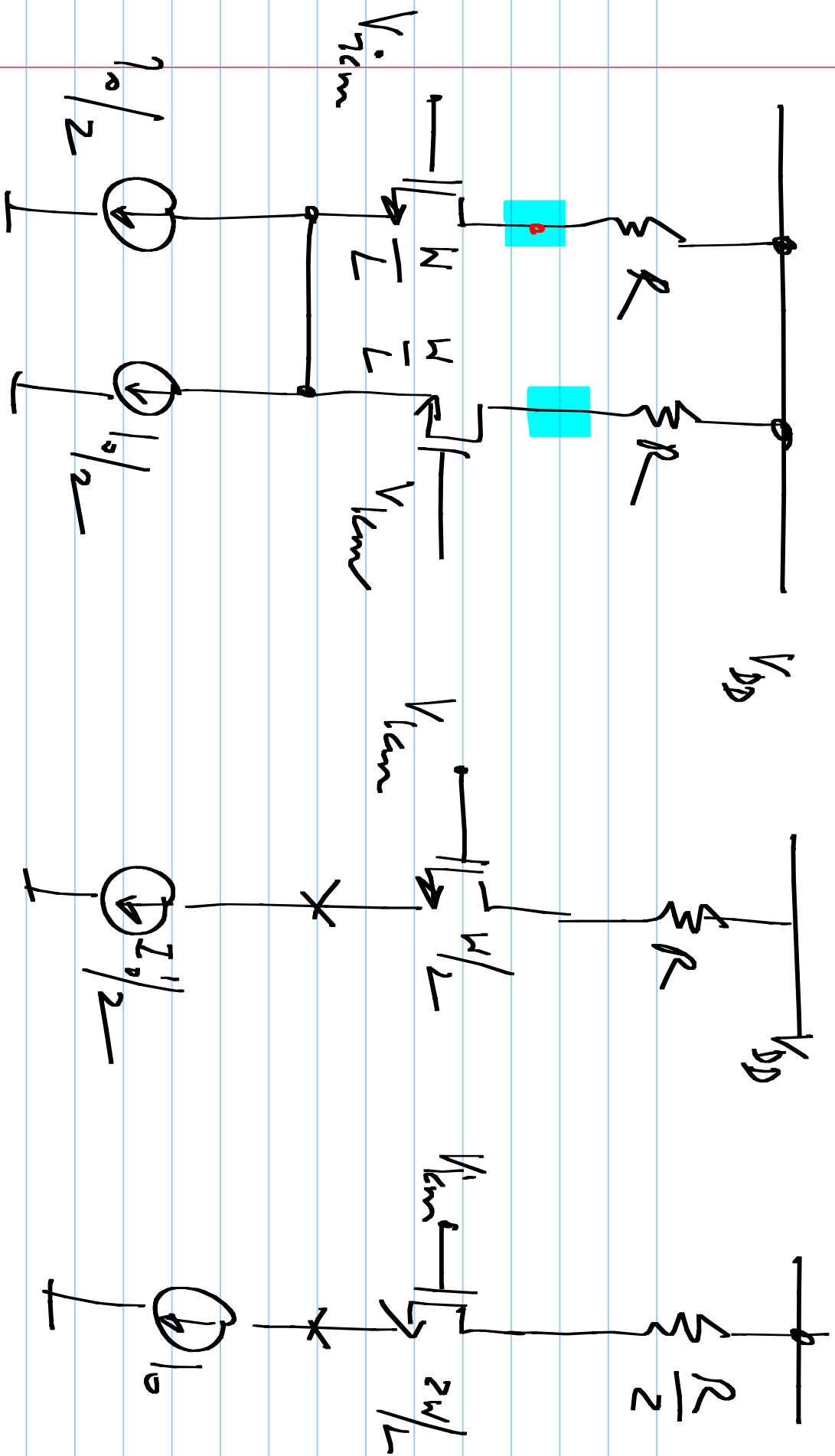


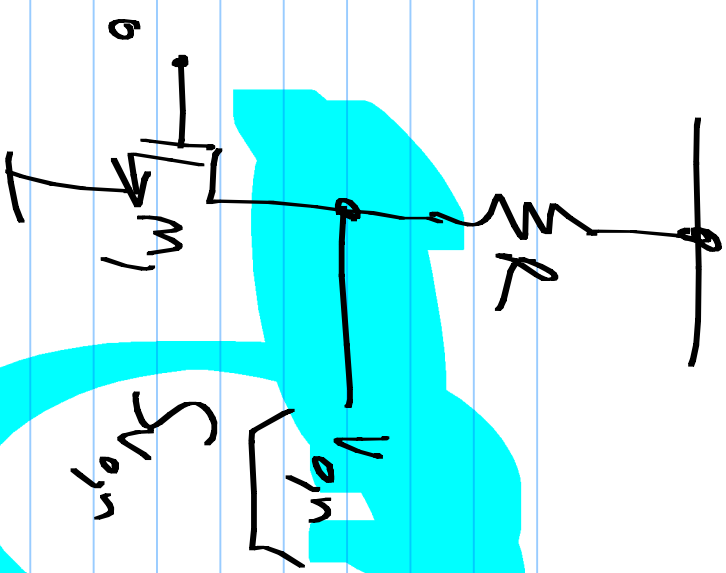
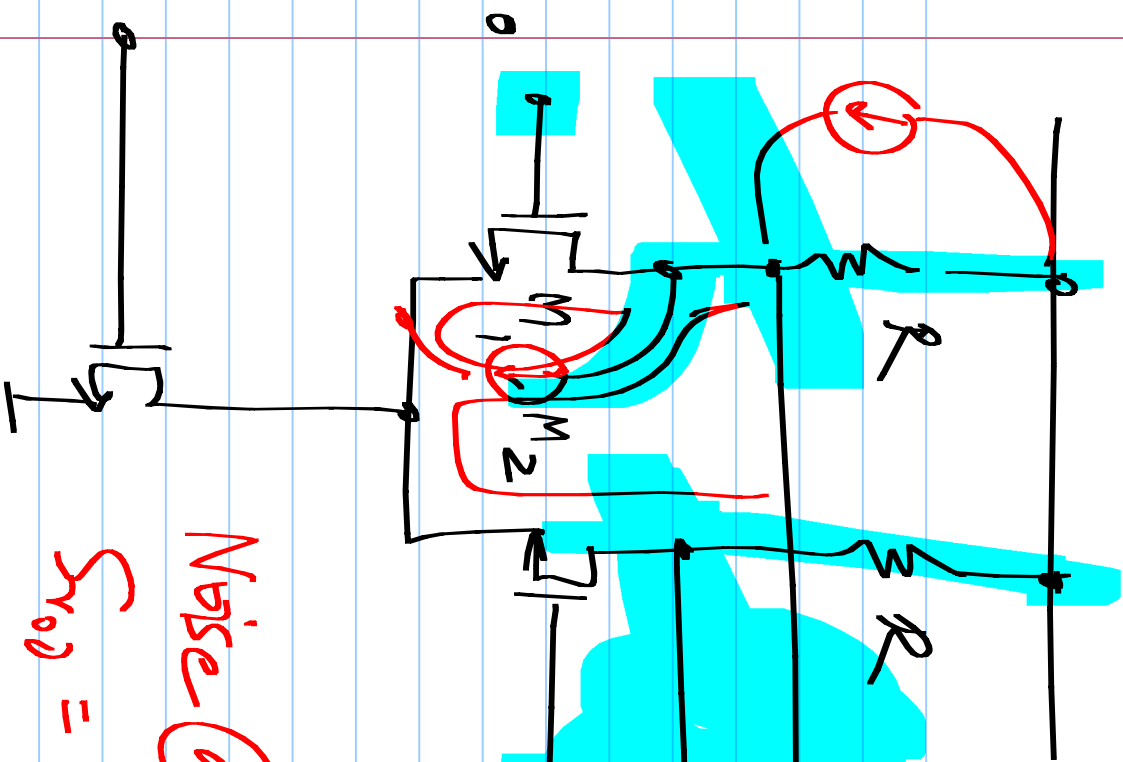












Noise @ differential output

$$S_{Vod} = 2 \times S_{V_{gn}}$$