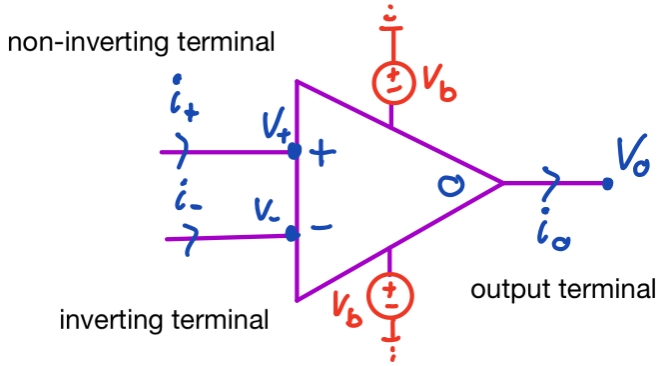
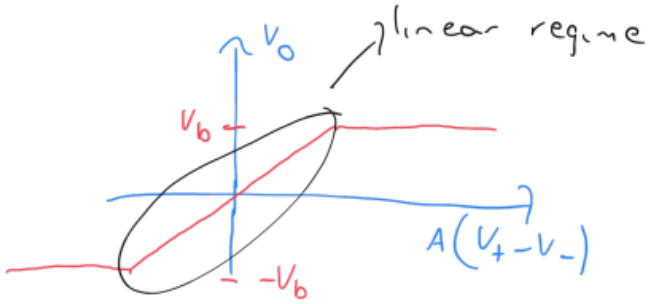
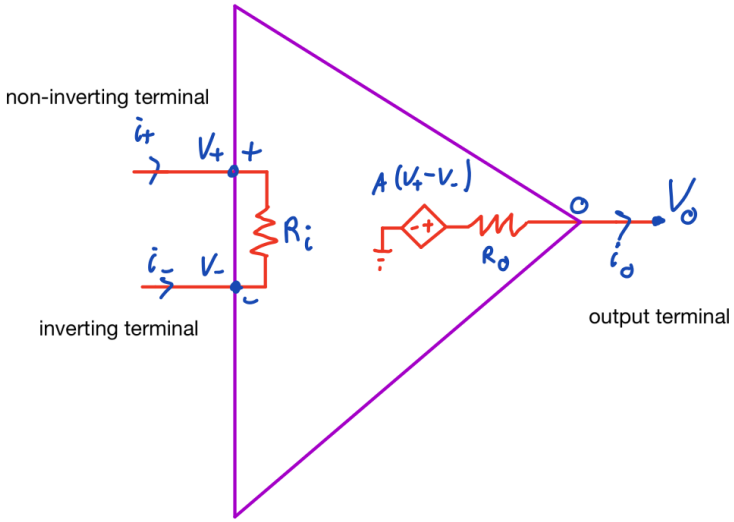
Lecture 10, Wednesday, February 2, 2022

- Operational amplifier (op-amp)





– Want to operate in the linear regime, where the op-amp can be modeled as:



* $|V_+ - V_-|$ is very small $(< 10\mu V)$
* R_i is very large $(> M\Omega)$
* R_o is very small $(< 10\Omega)$
* A is very large $(> 10^6)$

  Can further approximate to

  * ***Ideal op-amp conditions***:
    - $i_+ = i_- = 0$, within pA
    - $V_+ = V_-$, within μV

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- It is a good idea to do KCL at inverting terminal
- It is a good idea to to trace V_o back to V_s
- It is a good idea to see where V_+ and V_- are connected
- **never** do a KCL at ground when there is an op-amp
- **do not** assume $i_o = 0$
- if you know the bias voltage v_b, make sure that $|v_o| < v_b$

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