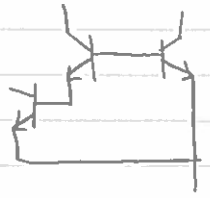
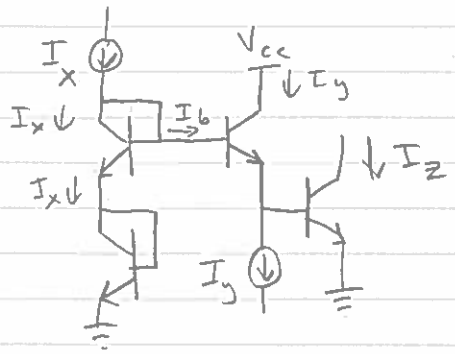
if loop not symmetrical:



$I_1 I_2 = I_3 (I_S)$ ← varies drastically w/ temp, don't design circuits that depend on I_S!



1mA → 1/6 V) WHAT??

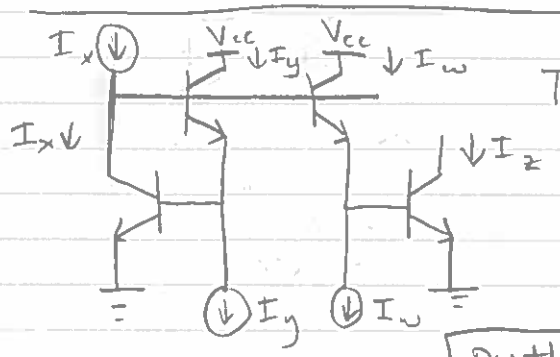
since $\beta = \infty$, $\alpha = 1$

$I_c = \alpha I_e \rightarrow I_c = I_y$

$I_b = \frac{I_c}{\beta} = 0$

$I_z I_y = I_x^2$ ←

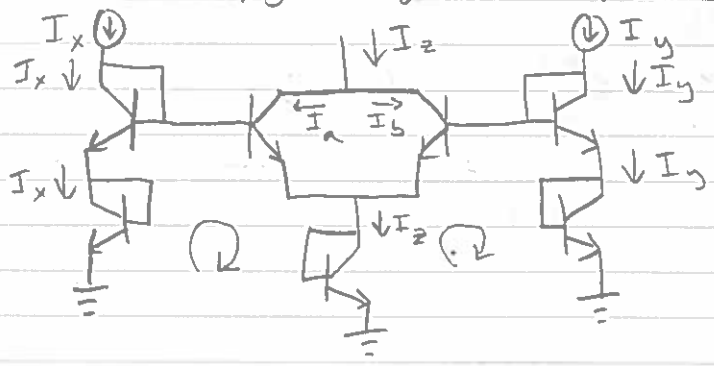
$$\boxed{I_z = \frac{I_x^2}{I_y}}$$



TLP → $I_x I_y = I_z I_w$

$$\boxed{I_z = \frac{I_x I_y}{I_w}}$$

Pythagorator



KCL ⇒ $I_a + I_b = I_z$

$I_a = I_z - I_b$

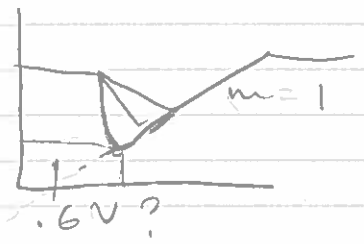
TLP → $I_x^2 = I_a I_z$ $\quad I_y^2 = I_b I_z$

$I_a = \frac{I_x^2}{I_z}$ $\quad I_b = \frac{I_x^2}{I_z}$

$I_z = I_a + I_b = \frac{I_x^2 + I_y^2}{I_z}$ → $\boxed{I_z = \sqrt{I_x^2 + I_y^2}}$

Postlab 3

Ruby Spring



$V_{out} = 5 - I_m R$

$V > V_{out}$ ⇐ DS in DS, some current in opposite direction

The voltage at the collector, V_{out}, is determined by

$$V_{out} = V_{cc} - I_{cm} R$$

So we see it is affected by the collector current, I_c.

As V_{in} increases, the BJT eventually reaches deep saturation where the collector-base junction is reverse-biased. and some current begins to flow the opposite direction (from the base to the collector), thus decreasing I_c. This decrease in I_c leads to a decrease in V_{out}. Why the slopes are all unity, I have yet to figure out, but I think, because they all overlap perfectly with the data from experiment 2, it has something to do with the emitter resistor value.