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Post Lab 4

1. $I_z = I_{z1} + I_{z2}$ $V_x - V_{x1} = I_x R$

TLP $\Rightarrow$ $I_x^2 = I_z I_{z1}$
$I_y^2 = I_z I_{z2}$

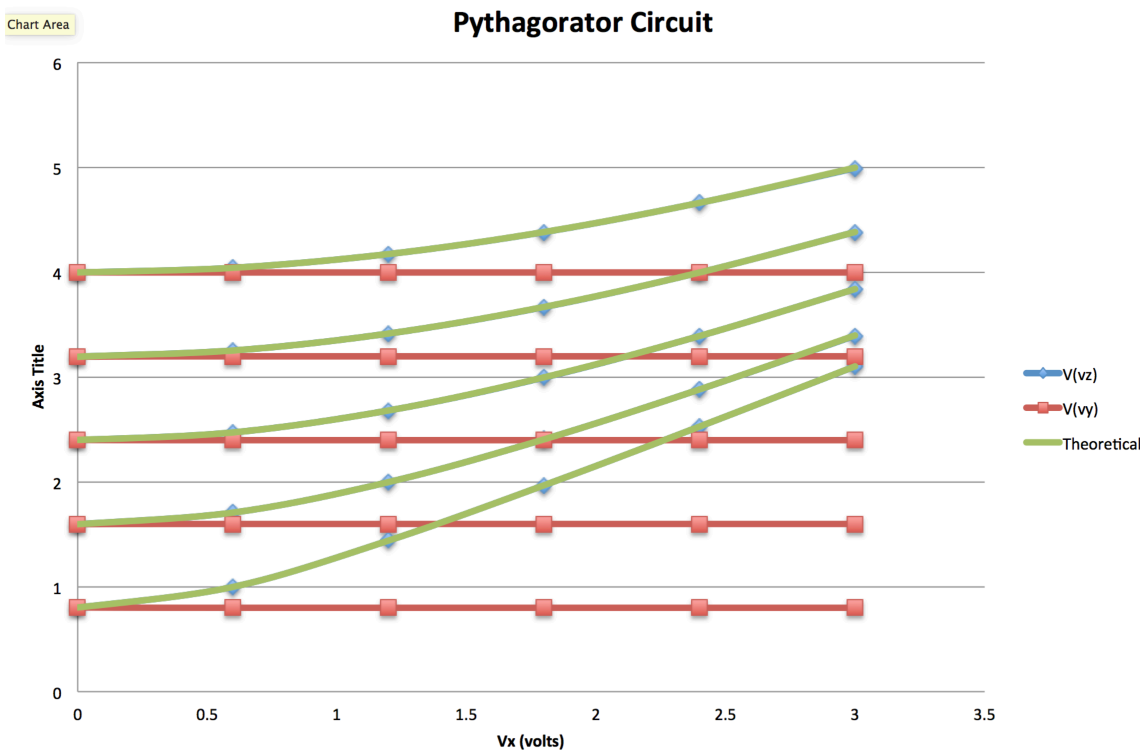
(a) All transistors should be forward active. The op-amps turn any input to (+) super negative because (-) is ground. So as long as V_x and V_y are just above 0, the drop across the resistor shouldn't turn it negative

(b) The currents I_x, I_y, & I_z can be defined with ohms law as $I_x = \frac{V_x}{R}$, $I_y = \frac{V_y}{R}$, & $I_z = \frac{V_z}{R}$ (a

(c) KCL $\Rightarrow$ $I_z = I_{z1} + I_{z2}$

(d) $I_x^2 = I_z I_{z1}$ (TLP)
(e) $I_y^2 = I_z I_{z2}$
(f)
$$I_x^2 + I_y^2 = (I_z I_{z1}) + (I_z I_{z2})$$
$$I_x^2 + I_y^2 = I_z(I_{z1} + I_{z2})$$
$$I_x^2 + I_y^2 = I_z^2$$
$$I_z = \sqrt{I_x^2 + I_y^2}$$

(g) $V_z = \sqrt{V_x^2 + V_y^2}$



The circuit has exactly the behavior we expected as can be seen from the match on Vz and the theoretical fit of Vz