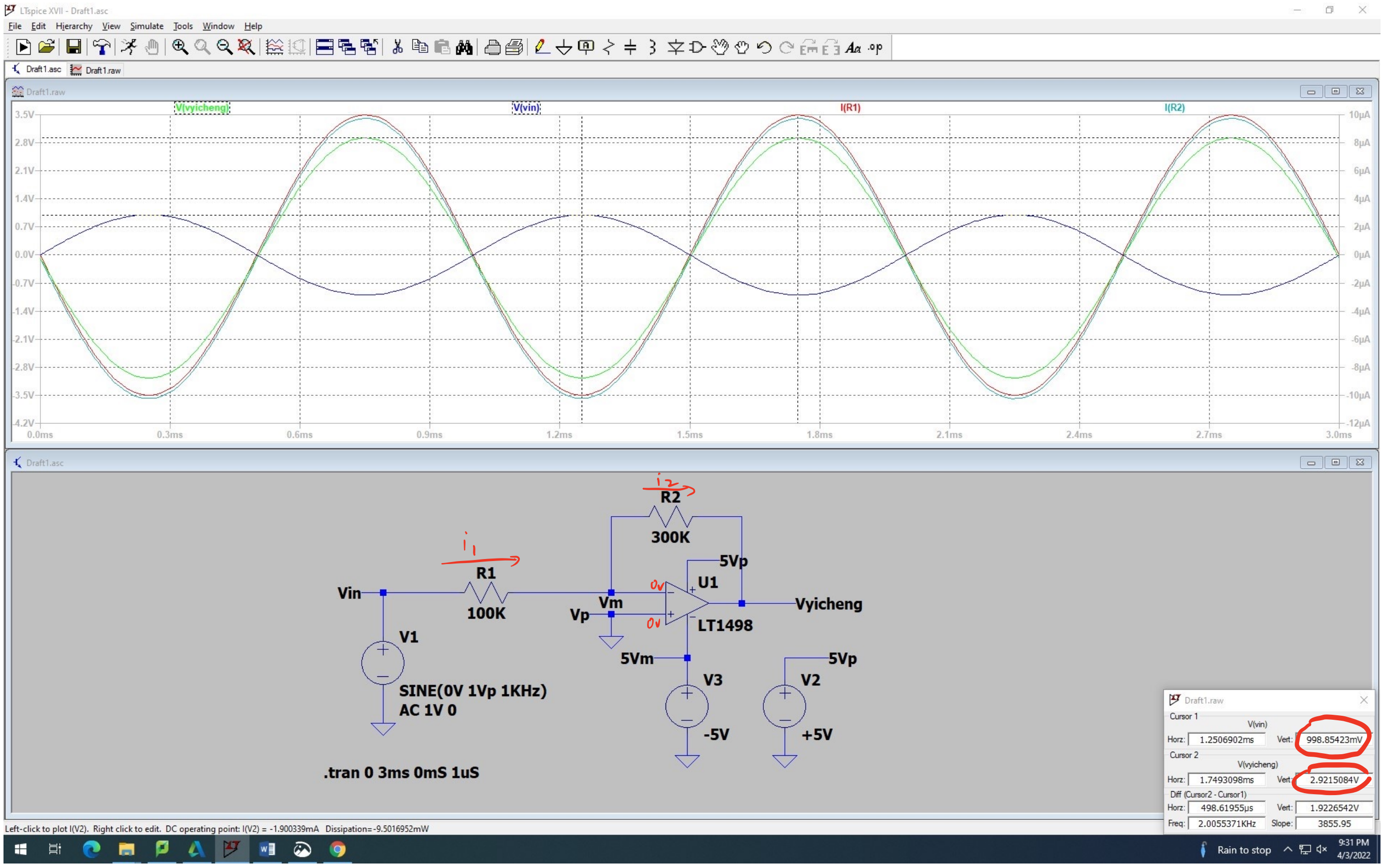


$$i_1 = i_2$$

$$\frac{V_{in} - 0}{R_i} = \frac{0 - V_{out}}{R_f}$$

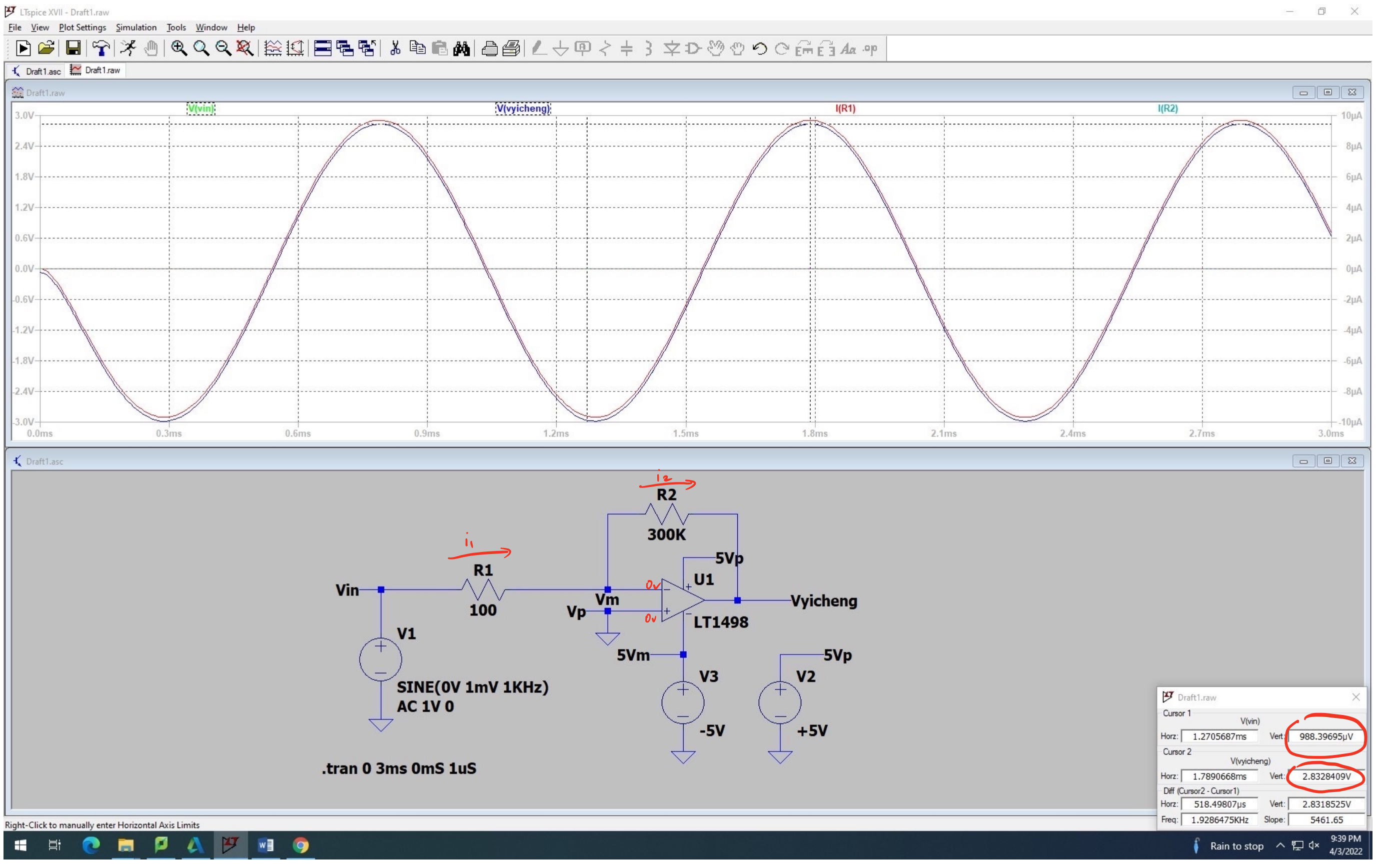
$$\frac{V_{out}}{V_{in}} = \frac{R_2}{R_1}$$

From simulation

$$\text{Gain} = \frac{V_{out}}{V_{in}} = \frac{2.9215}{0.9986} = 2.9285$$

$$\text{Gain} = \frac{R_2}{R_1} = \frac{300k}{100k} = 3$$

The calculated gain is almost same with the simulated gain.



From Simulation

$$\text{Gain} = \frac{V_{out}}{V_{in}} = \frac{2.8328}{988.4 \times 10^{-6}} = 2866$$

$$i_1 = i_2$$

$$\frac{V_{in} - 0}{R_i} = \frac{0 - V_{out}}{R_f}$$

$$\frac{V_{out}}{V_{in}} = \frac{R_2}{R_1}$$

$$\text{Gain} = \frac{R_2}{R_1} = \frac{300k}{100} = 3000$$

Compared to the previous simulation, R1[i], R2[i], Vout are not very different, but the amplitude of Vin is much smaller (1000 times) in this simulation.