INDUCTORLESS CHUA'S CIRCUIT

(based on http://www.chuacircuits.com)

The circuit shown below is a version of Chau's Circuit in which the physical inductor has been replaced by a synthesized inductor (aka: "gyrator") consisting of R7, R8, R9, R10, C, and two op-amps.

$L = (R_7R_9R_{10}C)/R_8$ for the synthesized inductor.

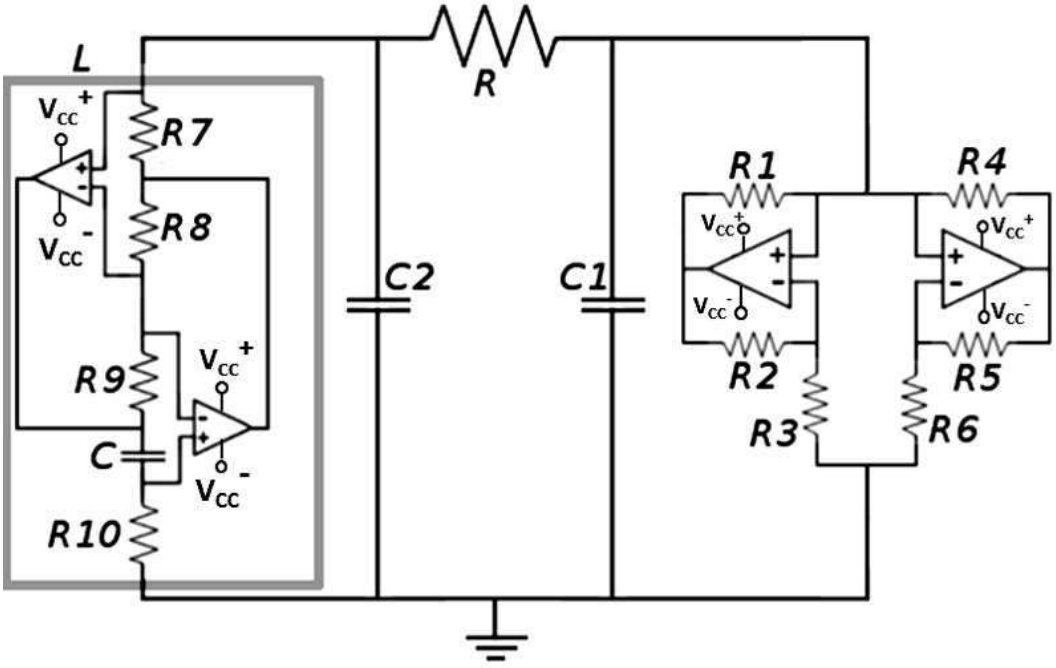

FIGURE A

COMPONENTS

R=2.5 kΩ (pot.)	C=100 nF
R_1=220 Ω	C_1=10 nF
R_2=220 Ω	C_2=100 nF
R_3=2.2 kΩ	
R_4=22.0 kΩ	
R_5=22.0 kΩ	
R_6=3.3 kΩ	
R_7=100 Ω	
R_8=1.0 kΩ	
R_9=1.0 kΩ	
R_{10}=2.5 kΩ (pot.)	

All op-amps are TL082 or equivalent.

Adjust R10 to a value of 1.8k Ohms to make the value of L = 18 mH. (Alternatively, you can replace R10 with a 1.8k Ohm fixed resistor.)

There are 3 voltages that are important in this Inductorless Chua's circuit. These are shown in Figure B as X, Y, and P.

X is the voltage across the capacitor C_1

Y is the voltage across the capacitor C_2

P is the voltage at the junction of R7 and R8 (measured with respect to ground) which can be used to determine the current through the inductor, I_L , by the relation $I_L = (V_P\text{-}Y)/R_7$

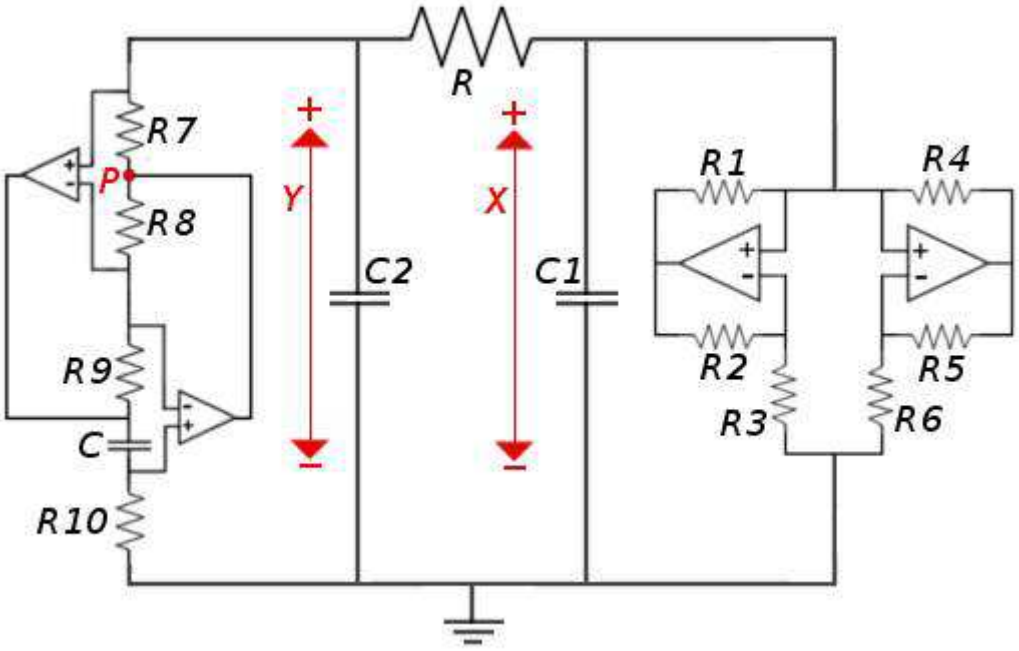

FIGURE B

Take any two of the three voltages X, Y, and P. Display either one versus the other to get the strange attractor for this Inductorless Chau's Circuit.