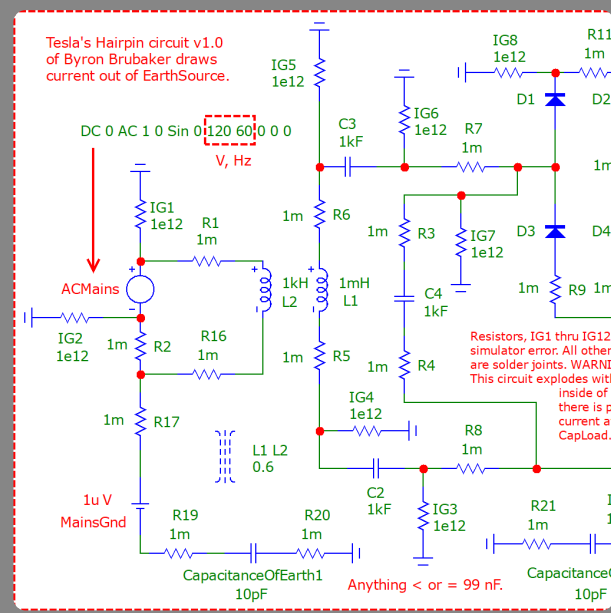


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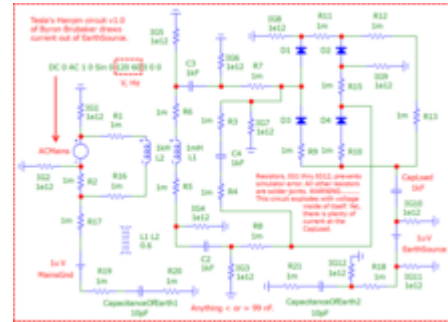


7 hours ago

The ground plane is not merely a zero reference.

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What is a Ground?



Schematic of a simulation of Byron Brubaker's rendition of Tesla's Hairpin circuit.



Output of Byron's Hairpin.

Up until now, I did not understand how a [Berkeley SPICE](#) ground component operates. Nor did I understand its difference from how a ground operates in [Paul Falstad's simulator](#).

But the study of [Byron Brubaker's version, 1.0, of Tesla's Hairpin Circuit](#) prompted me to finally understand these differences.

The ground components in both simulators are unique to each other due to how a referencing ground operates in each simulator.

In Paul Falstad's simulator, a referencing ground is already provided by the software. So, the user does not have to insert one anywhere since that has already been accomplished. The only purpose for the user to insert a ground (in Paul Falstad's simulator) is to act as a source for electronic flow of current. This presupposes that the Earth is a battery of around one microvolt whose amp-hour capacity is vast!

A referencing ground is not provided in the Berkeley SPICE family of simulators, to which [Micro-Cap](#) and [LTSPICE](#) are members. So, this is the only function which a ground represents in these simulators. If you want to represent anything else, such as what a user-inserted ground would represent in Paul Falstad's simulator, then you have to insert a micro volt battery in between a ground and your circuit. You will also have to add a low-level capacitor behind the battery. I have labeled these, *CapacitanceOfEarth1* and *CapacitanceOfEarth2*. Between this battery and the circuit, you may position your load. Mine, here, is a capacitive load, labeled: *CapLoad*. It is *not* a resistive load because that cannot sustain the *transient* (a momentary surge) which this simulation suddenly provokes and quickly dissipates to zero. So, a relatively large capacitive load could retain its charge and a series of switchings could clear these charges to zero by transferring these charges to the actual load that you wish to power and then restart this circuit from another cold start?

All of my capacitors possess 3 Ohms of equivalent series resistance. Both of my coils possess units of resistance equal to their units of inductance to approximate a wire gauge of 25 AWG.

The rate at which over-reactance exhibits overunity is determined by the smallness of the two capacitors, labeled: *CapacitanceOfEarth1* and *CapacitanceOfEarth2*. Although the Earth's capacitance is assumed to be ~711 micro Farads, this does not produce overunity within a reasonable length of time. Or else, it may possibly fail to produce overunity at all. I don't know. I didn't have the patience to wait long enough to find out! So, to speed things up a bit, I chose to use values which are less than 100 nano Farads, such as: 99nF or 10pF or 100 femto Farads.

- BTW, one micro volt is the atmospheric voltage at ground level which is enough to power a crystal radio set from the 1920s.
- *ACMains* amperage is the amperage which is being drawn from the utility grid.
- *MainsGnd* is the amperage which enters the circuit from the ground adjacent to the *ACMains*.
- *EarthSource* is the amperage which the Earth is providing free of charge!
- *CapLoad* voltage (graphed in blue) dominates *CapLoad* amperage (graphed in red) by a factor of 3 to 1 (graphed in green at the very bottom of its output chart of oscilloscope tracings) due to the equivalent series resistance of this capacitive load is set to 3 Ohms.
- BTW, I posted the pre-explosive output of virtual oscilloscope tracings captured at 620 milli seconds rather than the explosive results at 638 milli seconds on the presumption that, if you choose to build this simulation, you may want to preempt these explosions rather than allow this circuit to experience them.

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