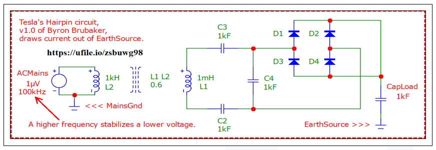
What is the [Ground Plane](#)?[1] [2]



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

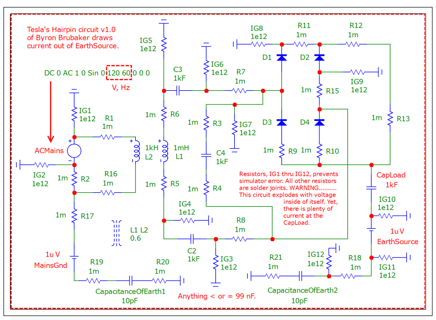
Up until now, I did not understand how a Berkeley SPICE[3] ground component operates. Nor did I understand its difference from how a ground operates in Paul Falstad's simulator.[4]


Output of the simulated drawing.

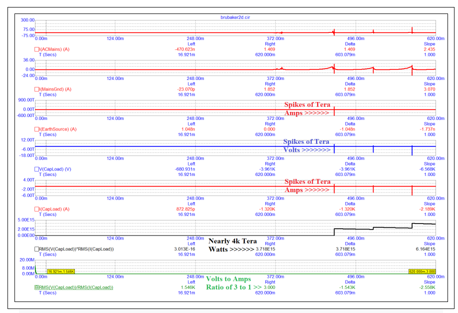
But the study of Byron Brubaker's version, 1.0, of Tesla's Hairpin Circuit[5] prompted me to finally understand these differences.

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 at ground-level whose amp-hour capacity is vast!



Raw schematic of an older version of a simulation of Byron Brubaker's rendition of Tesla's Hairpin circuit. Notice the complexity of this previous version versus the simplified drawing, up above? Don't build this version; build that one and *safely* play with modifying its parameters.


Output of the older, simulated version of Byron's Hairpin.

A referencing ground is not provided in the Berkeley SPICE family of simulators, to which Micro-Cap[6] and LTSPICE[7] 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

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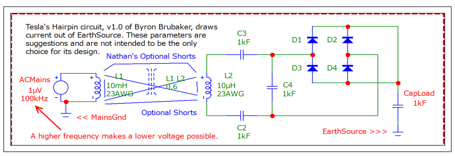
1 Antenna Ground Plane: Theory & Design » Electronics Notes (electronics-notes.com)
2 The ground plane is not merely a zero reference.
3 The SPICE Page
4 Paul Falstad's electronic simulator
5 My discussion of Byron's Hairpin Circuit on Quora
6 Micro-Cap 12 electronic simulator
7 LTspice – Fast • Free • Unlimited

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.

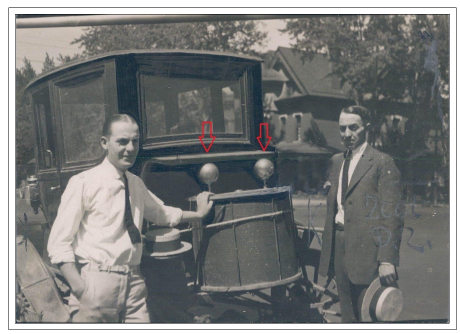
- BTW, one micro volt is the atmospheric voltage at ground level which is enough to power a crystal radio set from the 1920s.
- *ACMains* amperage is the amperage which is being drawn from the utility grid.
- *MainsGnd* is the amperage which enters the circuit from the ground adjacent to the *ACMains.*
- *EarthSource* is the amperage which the Earth is providing free of charge!
- *CapLoad* voltage dominates *CapLoad* amperage by a factor of 3 to 1 due to this component's equivalent series resistance is set to 3 Ohms.
- BTW, if you choose to build either of these simulations, you may want to (somehow) engineer the prevention of their tendency towards exploding, suddenly, with an excessive amount of power rather than allow this circuit to fry itself (or throw shrapnel in all directions).



Brubaker's Hairpin with shrunken coils and pressurized caps.

You can get away with shorting out the four terminals of this step-down transformer and you'd almost get the same level of output, but you'd be wasting a slightly elevated input power. Patent “US 600,457 A” for Nathan Stubblefield's Earth Battery may be on the left if we replace “ACMains” with a live oak tree and replace “MainsGnd” with its roots in the Earth not including what is missing from his patent to (<<<<) its right.

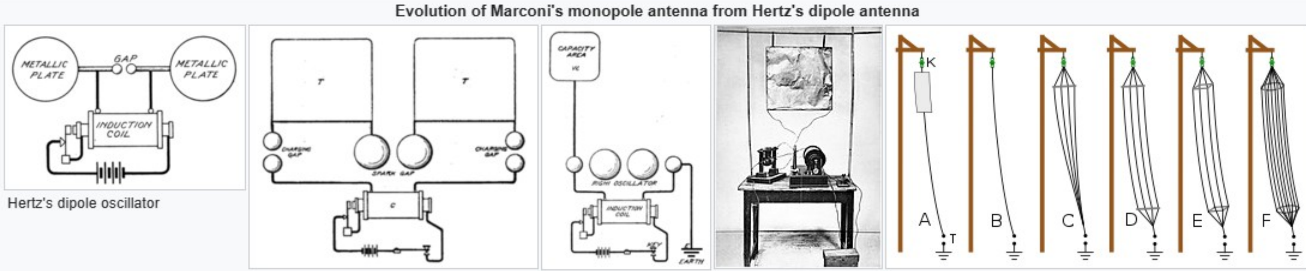
If you don't have access to the Earth to serve as your “ground plane”, in the alternative, you can simulate the Earth's ground plane by utilizing a large conductive surface, such as: another antenna. This is what the Ammann brothers did with their Atmospheric Generator: they used two spherical antennas to serve as their monopole antenna plus ground since their mobile power station of their batteryless electric car of 1921 needed a grounded antenna and they could not provide an Earthed ground plane for their car.



The red arrows point to their dipole antenna substituting for Brubaker's pair of upside-down Earth grounds.

In other words, turn this image (up, above) upside down and imagine its two electric grounds are two spherical antennas similar to what the Ammann brothers mounted on top of the drum-shaped power station which was strapped to the front-end of their car >>>>

Evolution of Marconi's monopole antenna from Hertz's dipole antenna



Hertz's dipole oscillator

Marconi first tried enlarging the dipole antenna with 6×6 foot metal sheet "capacity areas" *(t)*, 1895[42] Metal sheets and spark balls not shown to scale.

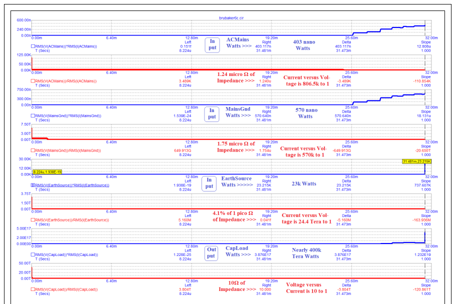
Marconi's first monopole antenna transmitter, 1895. One side of spark gap grounded, the other attached to a metal plate *(W)*.[42]

Re-creation of Marconi's first monopole transmitter

Early vertical antennas. *(A)* Marconi found suspending the metal plate "capacity area" high above the ground increased range. *(B)* He found that a simple elevated wire worked just as well. *(C-F)* Later researchers found that multiple parallel wires were a better way to increase capacitance. "Cage antennas" *(E-F)* distributed current more equally between wires, reducing resistance

A dipole antenna is similar enough to a grounded monopole antenna to serve as its replacement. An example of a dipole antenna is the spark-gap transmitter of Heinrich Hertz as it morphs into the monopole antenna of Guglielmo Marconi.

All 4 caps: C1, C2, C3 & CapLoad, possess 10 Ohms of ESR. Applying pressure will raise their ESR and is hinted in a Tesla patent for manufacturing capacitors under pressure, "US Patent 577,671". Thanks go to Byron Brubaker for this tip! Surf to ... *Equivalent series resistance* for an explanation of ESR.



An output of 400k Tera Watts at the CapLoad versus an input of no greater than the EarthSource (contributing 23k Watts) is a ratio of output to input of 17.4 Tera to 1!

Tesla also has a patent for using oil as a dielectric material for capacitors: "Patent No. 567,818". Pressurizing this oil may be the easy way to increase the equivalent series resistance of a capacitor to alter its behavior in an overunity circuit? What do you think?

The output of virtual oscilloscope tracings to the right > > > > > > > establishes an impedance which varies over time. This refutes any credibility that resonance is required. Rarely, does resonance have anything to do with overunity. For, impedance starts out very high at the beginning of all of the red tracings to the far-left in which voltage dominates over current. Yet, over the course of 32 milli seconds, that situation drastically changes in which current dominates over voltage due to a drop in impedance to the far right. The circuit actually alters its own impedance! Ask a tank circuit to do that! Yeah, right... This drop of impedance probably has something to do with the rise of wattage traced in all of the blue graphs?

WARNING — HIGH NODAL VOLTAGES WILL ACCUMULATE!

How much Energy Does it Take to Operate Reactance (also known as Reactive Power)?

Answer …

It takes an indeterminate quantity of energy to operate reactance. It takes some energy, but the actual required amount may vary or be irrelevant due to the parametric property of certain types of reactance.

But just because the quantity of reactance may not matter does not make it possible to do away with it altogether unless we make up the difference with an unlimited supply of energy (and money to pay for that energy) to operate a non-reactive, or semi-reactive, appliance.

If we make an analogy between energetic water flowing within a reactive medium such as through a conduit (pipe) representing current flowing through a conductor (possessing inductance), then either an infinite amount of time or an infinitely large pipe will single-handedly be capable of conducting an unlimited quantity of water through that pipe.

And, since time is regulated by the frequency of oscillations and also regulates the phase relations between voltage and current, time is another factor of reactance besides capacitance and inductance. Thus, we have four factors to regulate the pumping of energy *against* a gradient of impedance – not by fighting that gradient, but – by effortlessly reversing current under certain conditions.

And, since the size of a pipe can be enlarged, its equivalency of inductance within a conductive medium may also be enlarged to any size desired, to accommodate any quantity of water which is carried within a pipe or any quantity of current within a conductor in any shortness of transit-time.

Think of a heat pump. It pumps water against a gradient of greater heat to increase that heat. Thus, it should (theoretically at least) get harder and harder to pump against an ever-increasing gradient of escalating heat, yes?

That's what happens if we ignore the power of reactance and focus all of our effort upon energetically pumping energy against a gradient, namely: against impedance.

But with the reversal of current, the opposite happens. It gets easier and easier to reactively pump energy against an ever-increasing voltage due to the constant acceleration of pumping action brought about by escalating reactances.

There are four reactances that we may manipulate to achieve these results. They are: mutual inductance, self-inductance, mutual capacitance and self-capacitance.

The mutual varieties of inductance and capacitance are an interesting pair of reactances, for they are inverses of each other. In other words, whenever mutual inductance is high, mutual capacitance is low. And, whenever mutual capacitance is high, mutual inductance is low.

If mutual reactances appear at all (and they, usually, always do), then they always appear together at the same time. They are never capable of entirely excluding each other. It is impossible for a circuit to possess mutual inductance without also possessing mutual capacitance.

In other words, …

An elevated magnetic coupling will possess an elevated mutual inductance while, at the same time, (it may be inferred that) a depressed mutual capacitance is also taking place. Likewise, whenever a very weak coupling among inductors takes place, mutual capacitance becomes elevated. Since the interactions among inductors is complex, it is an over-simplification to ignore their mutual capacitances varying over time along with variations of their mutual inductances. And it is impossible for mutual reactance to have no impact upon self-reactance. So, the mutuality of reactance guides the outcome of self-reactance.

This is analogous to how messenger RNA can affect the outcome of gene expression despite the physicality of the DNA due to an endless list of factors, not the least of which are: stress, the weather, poor nutrition, lack of sleep, etc.

These two properties of mutual reactance trump the self-referral versions in that, for some uncanny reason, mutual reactance may escalate, or diminish, over time even though self-reactance cannot. Mutual reactances are, thus: parametric.

Go, figure!

Power is the rate of Energy Usage. Power can also imply Efficiency of Energy Usage and can be less than, or more than, Unity.

Reactance always affects Power to one extent or another.

Time is not the only factor which can modify the Reactance of Energy Usage. All of the factors of Electrical and Magnetic Reactance can also modify Reactive Power, such as: Frequency, Duration, the Phase Relation between Voltage and Current, Capacitance and Inductance (just to name a few of the numerous factors of *Reactive* Power).

It may take a minimum quantity of Energy to accomplish a task, but this is superseded by having sufficient Power (both Real and Reactive) to get the job done. Thus, don't allow yourself to be shocked when any overunity circuit exhibits a Wattage of Output exceeding its Wattage of Input.