Nikola Tesla's Electric Car Power Supply --- 20 21 ---

Michael Gamble

There are numerous stories about Nikola Tesla's fabled electric powered Pierce-Arrow car. If the stories are factual, then sound engineering should be able to reproduce it. In the past, it was demonstrated that a working demo model could be reverse engineered and built from those stories. The "Series Resonate" and "Dual Resonate" system demo models I built and documented at TeslaTech 2018 and 2019 both showed a large increased resonate efficiency (30% to 90%). If the numbers are correct the resonate "Q-factor" still has to be increased more to achieve a self running standalone resonate system

I know of two ways to increase the "Q" factor of a resonate system. The first method is to increase the reactive component by adding a large (10x) inductor in series with the motor impedance. I built and documented a working "Series Resonate" demo model of this method and presented it at the TeslaTech 2018 conference. The second method is to decrease the real component by removing the motor impedance from the resonate circuit. The motor is now bridged between two out of phase resonate circuits. The preliminary numbers indicate this "Dual Resonate" system should increase the system "Q" factor even more. Tesla stated that his resonate systems ran near unity (99.8%) but not over it!

The Use of Tesla Coils for the Wireless Transmission of Electricity

Gary Peterson

From the starting point of the commercial iron core induction coil transformer this presentation tells the story of Tesla's development of the World Wireless system transmitter over the years between 1891 and 1936. His original improvement of the commercial coil driver circuit, and improvements to the transformer itself resulted in the high-potential, high-frequency induction coil bearing his name... the Tesla Coil.

Tesla coil circuits were used commercially in spark gap radio transmitters for wireless telegraphy until the 1920s. Tesla experimented with numerous configurations using two, sometimes three, coupled resonant electric circuits. These circuits were used for innovative experiments in electrical lighting, phosphorescence, X-ray generation, electrotherapy, and ultimately the transmission of electrical energy without wires.

Demonstrations include operation of Ford "buzz box" automobile ignition spark coil, single wire operation of light/motive devices connected to a high frequency induction coil, and wireless transmission by electrostatic induction using an ungrounded dual terminal Tesla coil transmitter. The latter foretells development of the "disturbed charge of ground and air" wireless method.

Wireless Power Transmission by Zenneck Surface Waves

Gary Peterson

The use of guided electromagnetic waves for the wireless transmission of electrical energy has long been the subject of scientific investigation. While attention is presently focused on the near-field inductive and far-field radiative techniques there is ongoing interest in the possibility of using a terrestrial transmission mode for wireless telecommunications and power transfer. Surface wave theory development is provided, along with comments on the functionality of Tesla's original designs.

Apparatus for the collection of Tesla wireless system performance data is described. The basic "Tesla wireless system" with elevated charge terminal and ground terminal electrodes, and symbols representing the generic transmitter excitor-driver and generic receiver load are shown. Comments are made on the one wire transmission with a ground return circuit leading to the true *Tesla wireless system*. Propagation modes are discussed, including the terrestrial Zenneck surface wave, the Corum brother's experimental verification, and NIST-traceable documentation of Tesla's 1899 surface wave propagation phenomenon. Demonstrations include power transmission by one-wire with ground return, atmospheric conduction with ground return, and wireless transmission between two ground terminals. Simulation of independent ground terminal electrodes is achieved by accessing the building's electrical ground system.