

Possible Transmission Line Propulsion Device
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Introduction

A propulsion device is proposed by emulating matter on a macroscopic scale with rotating standing waves. Emulation is achieved by radial rotating a transmission line standing wave near the speed of light. Energy density for the rotating transmission line standing wave is analyzed and power dissipation is considered. A relationship describing the rotating standing wave gravitational interaction force is presented. The gravitational interaction results in force vectors possibly describing the Dimitrion Pendulum experimental results (Reference 3).

Electro-Gravitational Force

Electro-Gravitational Force (EGF) Equation 1 describes an electron's gravitational interaction force in terms of inductance and capacitance reactance phase angles (Reference 1):

$$F^{''''}(\phi'') := \left[\frac{X_L \cdot e^{j \cdot \left(\frac{\pi}{2}\right)} \cdot (i LM)^2 \cdot A \cdot B}{\omega LM \cdot r_x} \right] \cdot \mu_0 \cdot \left[\frac{\cot(\phi') \cdot \cot(\phi'') \cdot X_L \cdot e^{j \cdot \left(\frac{\pi}{2}\right)} \cdot (i LM)^2 \cdot A \cdot B}{\omega LM \cdot r_x} \right]$$

Equation 1. EGF equation showing inductive and capacitive reactance phase angle parameters.

Gravitational force magnitude from Eq(1) is plotted in Figure 1 as a function of reactance phase angle. Force becomes attractive or repulsive as phasing deviates from 90 degrees.

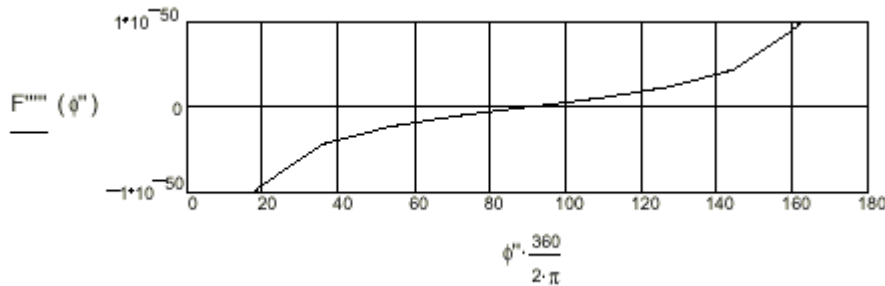


Figure 1. Gravitational force magnitude versus either inductive or capacitive reactance phase angle from Eq(1). Note zero force magnitude occurs at 90 degrees.

In transmission line theory, the phase angles determine the phase relationship of transmitted wave distributed voltages and currents along the line.

Transmission Line Power Flow

Figure 2 shows the electric and magnetic fields around an infinite lossless two-conductor transmission line. Power flow is parallel to the line and is given by the instantaneous Poynting vector. For the case of a wave traveling or standing on a lossless transmission line, power flow described by the instantaneous Poynting vector is perpendicular to the E and H fields:

$$S = E \times H \tag{Eq(2)}$$

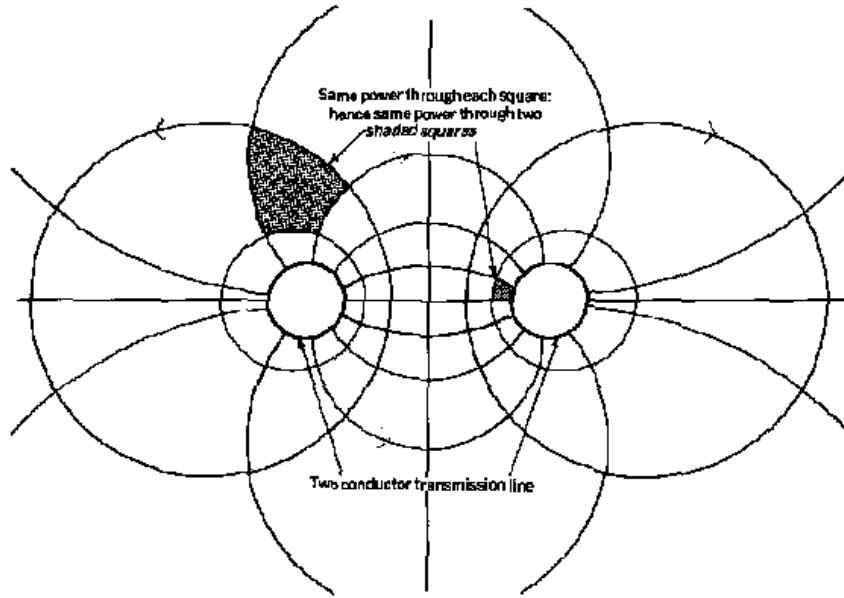


Figure 2. Electric and magnetic field map for a two-conductor lossless transmission line from Reference 4.

For a standing wave, the Poynting vector magnitude is proportional to the electric field squared:

$$S = -4 \sqrt{\frac{\epsilon}{\mu}} E_o^2 \cos wt \sin wt \cos bx \sin bx \quad \text{Eq(3)}$$

Where for free space:

$$b = \frac{2p}{l} \quad \text{Eq(4)}$$

Figure 3 shows a power flow map calculated from Poynting vector integration over the surface plane perpendicular to the E and H fields. Maximum power flow is concentrated near each conductor where the electric field is maximized. As depicted in Figure 2, power flow or energy density is equal for each field line curvilinear square. Since the curvilinear square areas increase as the field lines diverge, power flow and energy density decreases with increasing distance from the conductors.

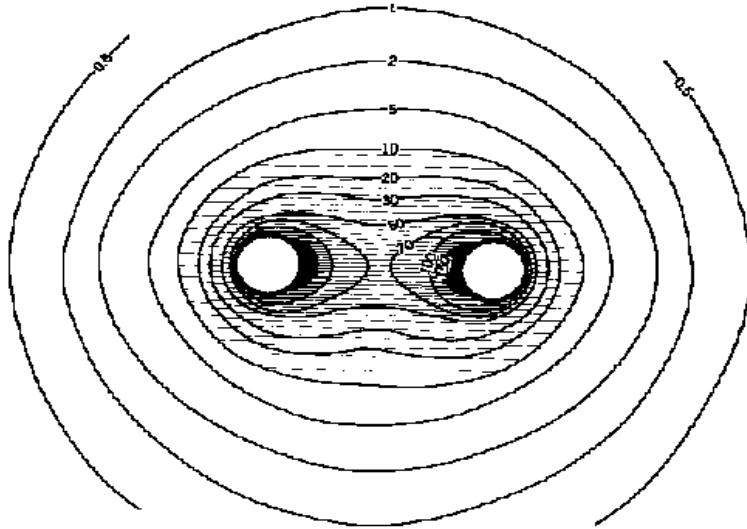


Figure 3. Power flow contour map for the transmission line of Figure 2 (Reference 4).

Transmission Line Standing Wave Energy Density

At the boundaries, a transmission line stable standing wave's incident E_i field and reflected E_r field is equal and opposite:

$$E_i = -E_r \quad \text{Eq(5)}$$

Integrating the Poynting vector over the plane perpendicular to the standing wave transmission line conductors yields zero net power flow in the direction orthogonal to the E and H fields (i.e.-the wave is stationary). Figure 4 illustrates the condition where $E = E_i + (-E_r) = 0$ results in a zero net Poynting vector and no transmitted power.

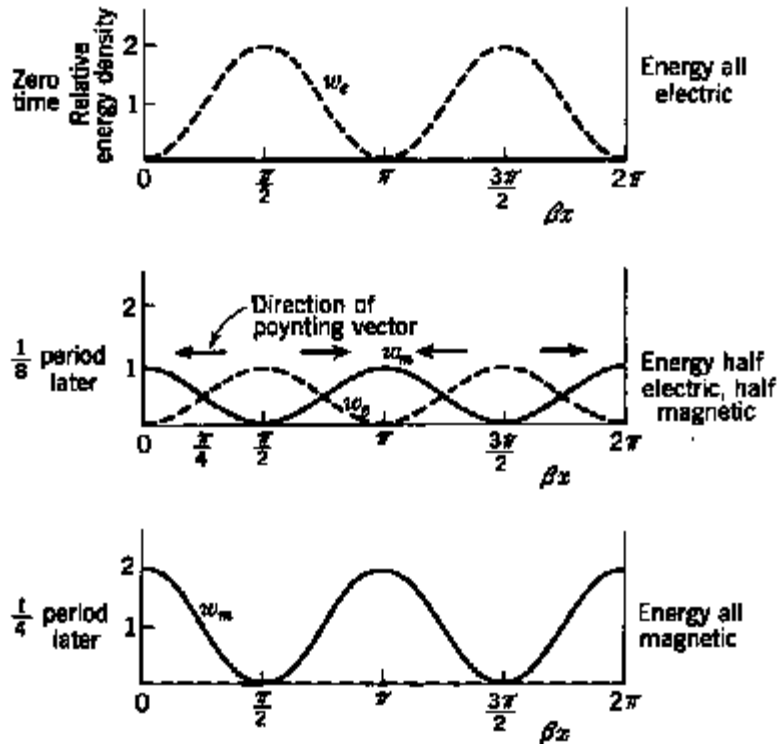


Figure 4. Shown are transmission line standing wave electric and magnetic energy densities for different time intervals (Reference 4).

The standing wave electrical energy density is:

$$w_e = 2eE_o^2 \cos^2 wt \cos^2 bx \quad \text{Eq(6)}$$

Since $H_o = E_i \sqrt{e/m}$, the magnetic energy density is:

$$w_m = 2mH_o^2 \sin^2 wt \cos^2 bx \quad \text{Eq(7)}$$

Equation (6) is maximum when Eq(7) is minimum and visa versa. Since voltage is related to the E field and current to the H field, the distributed line voltage and current are phased 180 degrees apart:

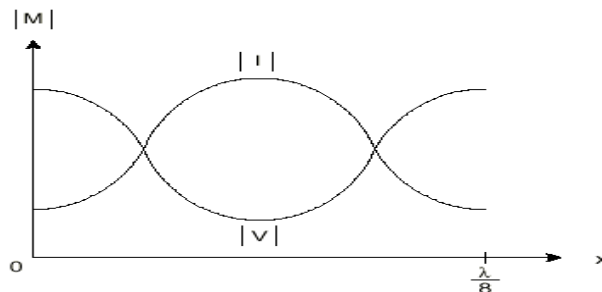


Figure 5. Standing wave voltage and current distribution plot for a transmission line terminated in $8Z_o$.

The non-zero standing wave electrical and magnetic energy densities are quadrature at $l/4$ spacing with the electric and magnetic energy exchanging in a reactive oscillation. The result is a space motion of the energy

back and forth over a $\lambda/4$ distance. The stored energy is not transmitted and circulates from electric form to magnetic form between spaces.

Field Interactions

For the transmission line standing wave of Figure 5, Equation (1) inductive and capacitive reactance angles are 90 degrees or quadrature and the gravitational interaction force magnitude is zero as shown by Figure 1. Changing the voltage to current phase changes the space motion area of stored energy oscillatory exchange and therefore the spatial power flow current density. The effect is similar to illustrated area sizes in Figure 2. The net energy exchange will be constant but spatial power and current will change since the stored energy spatial areas change. This results in the net Poynting vectors again canceling to zero from Eq(5). Standing wave power flow on a stationary transmission line is phasing independent. Interesting to note as the voltage to current phase approaches 180 degrees, the electric and magnetic fields are time coincident. There is no time difference so the oscillatory energy cannot be spatially exchanged. This corresponds to the 0 and 180 degree curve asymptotes of Figure 1.

Radial rotating a stable transmission line standing wave results in a non-orthogonal E and H field Poynting vector with angular velocity:

$$\mathbf{w}_r = \frac{d\mathbf{q}}{dt} \quad \text{Eq(8)}$$

A net circular power flow occurs from the radial current and energy must be expended in order to maintain the standing wave. Since the additional power is not radiated into space or dissipated as ohmic heat (assumes an infinite lossless line), the power must be dissipated in the surrounding fields. Equation (1) describes this as the gravitational interaction force. This gravitational force is the result of power dissipation from the radial current.

Conclusion

Phasing a transmission line rotating standing wave distributed voltage and current will vary the EGF gravitational interaction. This is analogous to changing the inductive and capacitive reactance phase angles of Eq(1). The EGF is a vector force and therefore has applications for a propulsion device.

References:

1. Electro-Gravitation As A Unified Field Theory, J. E. Bayles, <http://www.electrogravity.com>
2. UFO Design 101, S. Burns, Sept. 1999, <http://www.electrogravity.com/UFOPLAN/>
3. On the Pendulum Oscillations Of A Suspended RF Resonant Circuit, S. G. Dimitrion <http://jnaudin.free.fr/html/stvrfpend.htm>
4. Electromagnetics, J. D Kraus, McGraw-Hill, 1984

Appendix - Possible Designs For Standing Wave Craft Technologies

Consider Figure 1A. Here a standard electronic printed circuit board micro-strip transmission line is described:

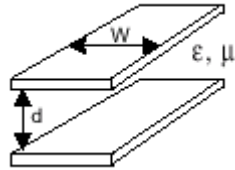


Figure 1A. Micro-strip diagram showing two conductors of width W , separation d , permittivity ϵ and permeability μ .

The equation describing the micro-strip characteristic impedance Z_0 is:

$$Z_0 = \frac{d}{W} \sqrt{\frac{m}{e}}$$

Notice that for a selected permittivity and permeability, the characteristic impedance Z_0 is simply the ratio of d/W . Now consider the micro-strip geometry of Figure 2A:

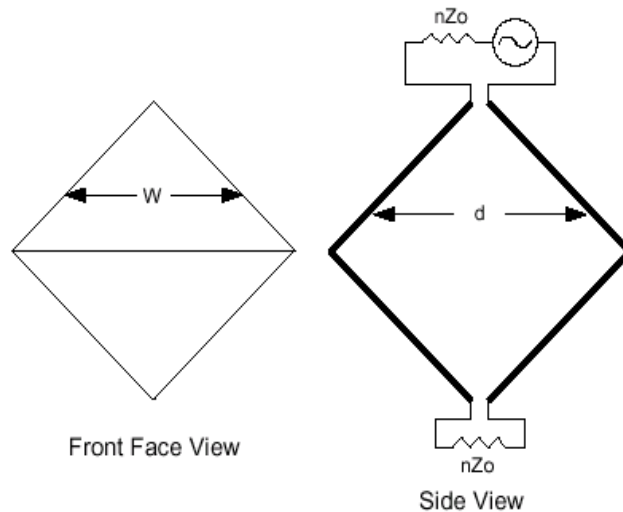


Figure 2A. Shown is a transmission line consisting of conductive triangular sheets. Notice the ratio of d/W is constant.

As the surface area widens, the separation distance increases maintaining a constant d/W ratio. Z_0 remains constant so this geometry should be a well-behaved transmission line and support a standing wave for TE₀ mode frequencies. Connecting sheets together will form an enclosure and time delaying the connected sheet standing waves creates radial wave rotation. For an eight surface double pyramid structure, two transmission lines are realized. Time delaying the wave feeds by 90 degrees effects radial rotation of the standing wave.

Below are several possible enclosure geometries utilizing the above approach:

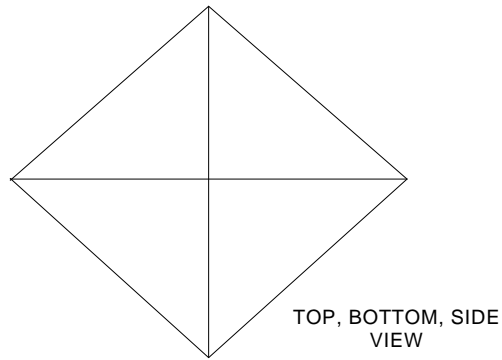


Figure 3A. Design for a symmetrical double pyramid craft rotating standing wave craft.

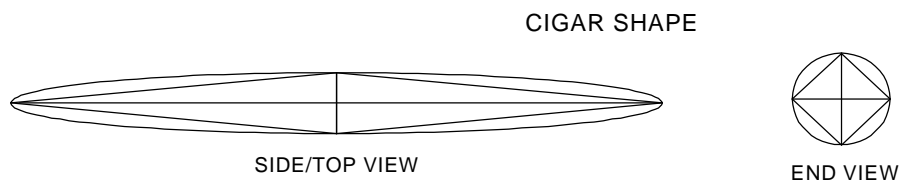


Figure 4A. Cigar craft design incorporating standing wave technology. The standing wave device is the four sided pyramid located at the center of the cigar shaped shell. The pyramid is stretched horizontally to form a cigar shape.

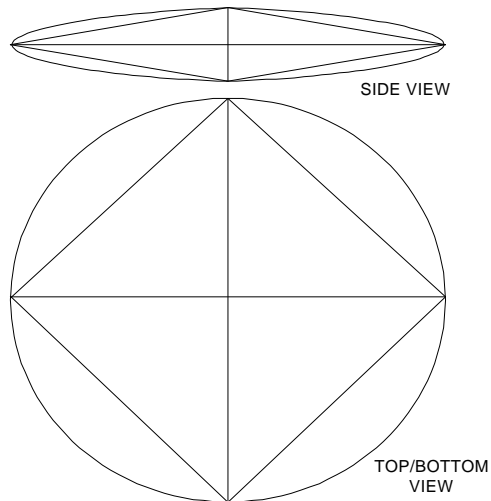


Figure 5A. Saucer craft design incorporating standing wave technology. The standing wave device is the four sided pyramid located at the center of the saucer shaped shell. The pyramid is squashed vertically to form a saucer shape.

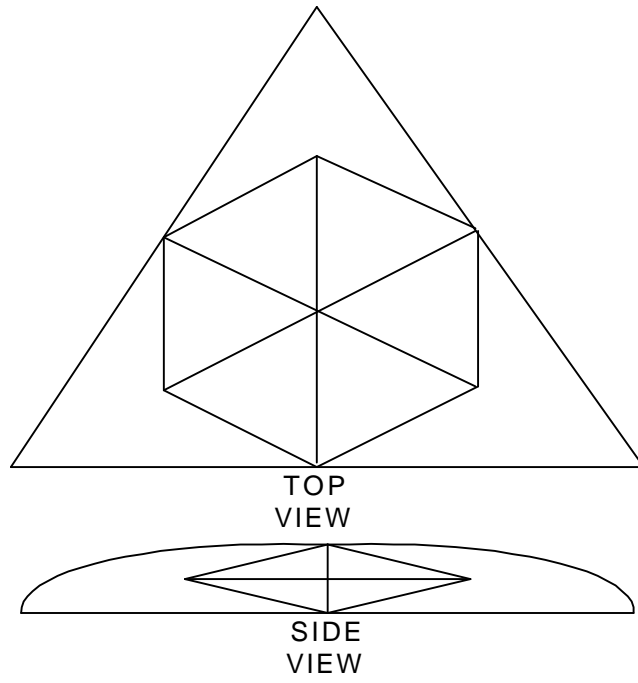


Figure 6A. Triangular craft design incorporating standing wave technology. The standing wave device is the six sided polygon located at the center of the triangular outer shell.