AN EFFICIENT METHOD FOR DRIVING LED ARRAYS FROM A SPATIAL ENERGY COHERENCE EXCITER

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Abstract—This paper covers various methods that can be used to drive LED [1] arrays from Spatial Energy Coherence [2] Exciter [3] Circuits to obtain maximum light output at maximum Exciter efficiency and Energy Coherence.

Introduction

SEC Exciters can be used to drive various load types ranging from non-inductive resistances for heating through many different designs of motors and loads specific to light generation.

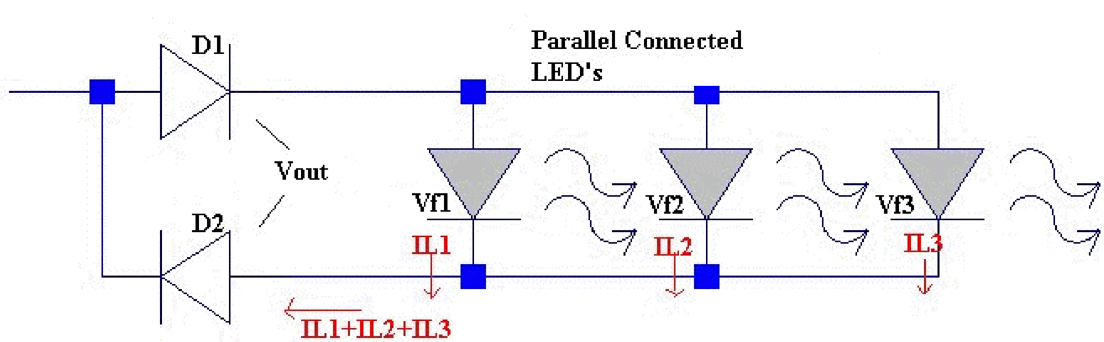
My research has shown LED's to be an optimum load for use in the generation of light with very high efficiencies and realized coherence or CEC [5] so long as a specific connection methodology is used with the LED's.

The rest of this paper covers the utilization of LED's as light producing loads, driven by SEC Exciters.

Problematic LED Circuits

Least Desired Configuration

Fig: 1



In Fig; 1, the AV Plug [6] connection to the Exciter is not shown and is indicated as the open wire on the left side of D_1 & D_2 of which form the AV Plug. Three LED's are indicated L_1, L_2 and L_3.

The inherent problem with this simple parallel connection of LED's is that the voltage developed by the Exciter and AV Plug and applied across the LED's will never be greater than the lowest forward voltage V_f expressed as V_{fx}. Therefore if we utilized a particular model of LED that has a specification range for V_f from 2.6 volts to 3.0 volts, we could have the following example conditions.

(A)

$V_{f1} = 3.0V$, $V_{f2} = 2.8V$ and $V_{f3} = 2.6V$

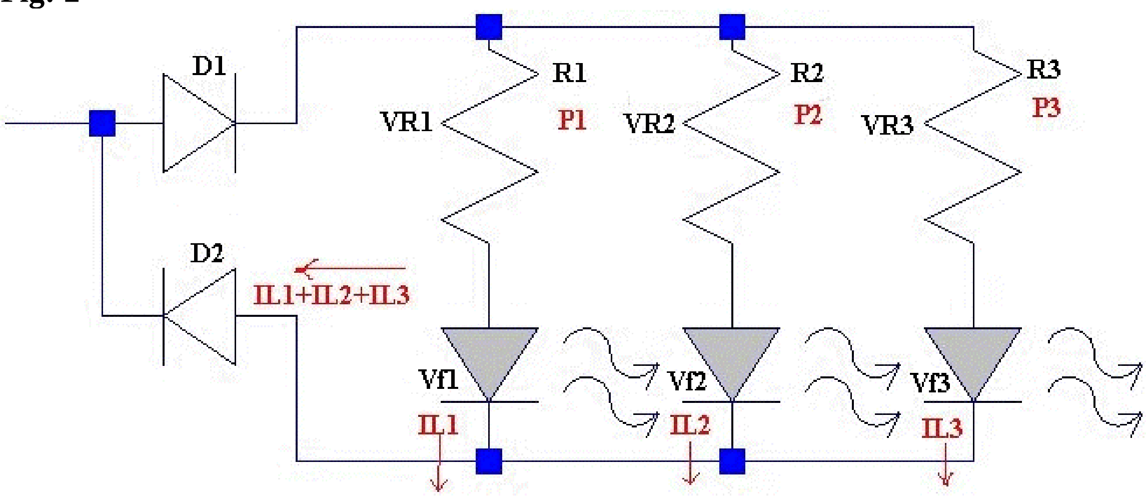
Looking at the forward voltages indicated, we see that V_{f3} limits the highest voltage the AV Plug will be able to generate, which is the lowest of the indicated forward LED voltages. Under this condition $V_{f1}=V_{f2}=V_{f3}=2.6$ volts. This will create a problem in that V_{f1} and V_{f2} are below their required V_f and the LED's will not be able to receive the required current for optimal light output.

For example if all V_f voltages were the same and under ideal conditions we would have a condition where $I_{L1}=I_{L2}=I_{L3}$, yet in this example, $I_{L1}<I_{L2}$ and $I_{L2}< I_{L3}$, only L_3 would be able to develop a significant light output.

This is therefore the worst of possible configurations in which one would drive a LED array from a SEC Exciter. Not only will the light output from the LED's very greatly, but also the Exciter is looking into very low impedance presented by the large current demands from the parallel-connected LED's. This low impedance will remove any possibility for a CEC>1.

Second Un-Desired Configuration

Fig: 2



The second example, which also does not work well, yet a better configuration than what is presented in Fig: 1. In Fig: 2 you can see that resistors are used to remove the effect of unbalanced LED forward voltages V_f and in many conventional LED circuits to limit the current passed through each LED.

To understand how the resistors do this, let us assume the output voltage of the AV Plug is 10 volts, V_{out}; this is the voltage that would be measured at the outputs of D_1 and D_2.

For illustration I will use the same V_f values as indicated in (A).

(B)

$V_{out} = 10$
$V_{f1} = 3.0$, $V_{f2} = 2.8$ and $V_{f3} = 2.6$
$R_1 = R_2 = R_3 = 200$ ohms

Now what actually takes place is that the resistor(s) will either present a higher or lower voltage drop across themselves in order that the sum of $V_{out} = V_{Rx} + V_{fx}$, look at the following using the values indicated.

Using $V_{Rx} = V_{out} – V_{fx}$

(C)

$V_{R1} = 10 – 3.0 = 7.0$ $\quad\quad V_{R1} = V_{out} – V_{f1}$
$V_{R2} = 10 – 2.8 = 7.2$ $\quad\quad V_{R2} = V_{out} – V_{f2}$
$V_{R3} = 10 – 2.6 = 7.4$ $\quad\quad V_{R3} = V_{out} – V_{f3}$

It can now be seem that the resistor does indeed compensate for different forward voltage values presented by the LED's. This does not although insure that each LED is supplied optimal current should the LED's not share a common or matched V_f. The only way this could be done if all V_f's were not the same is to individually select the values of R for each LED.

Here is the calculation for the current through each LED in our example shown in Fig: 2.

(D)

$I_{L1} = (10.0 - 3.0) / 200 = 0.035$ or 35mA $\quad\quad I_{L1} = (V_{out} – V_{f1}) / R_1$
$I_{L2} = (10.0 - 2.8) / 200 = 0.036$ or 36mA $\quad\quad I_{L2} = (V_{out} – V_{f2}) / R_2$
$I_{L3} = (10.0 - 2.6) / 200 = 0.037$ or 37mA $\quad\quad I_{L3} = (V_{out} – V_{f3}) / R_3$

I_L total $= I_{L1} + I_{L2} + I_{L3} =$ 35mA + 36mA + 37mA = 108mA

It is easily seen in (D) that each LED passes a different current as a result of both a fixed value of the limiting resistor and the different V_f's of each LED. In order to insure each LED was supplied the same current would require the appropriate calculation and selection of the limit resistor.

Another problem with the circuit in Fig: 2, is the waste of energy by the limit resistors. The resistors in dropping the voltage will dissipate wasted heat as a result. For illustration I have calculated the power distribution for the Fig: 2, circuit and one can easily sees the waste by the resistors.

(E)

$P_{R1} = (0.35^2) * 200 = 0.245W$ $\quad P_{R1} = I_{L1}^2 * R_1$
$P_{R2} = (0.36^2) * 200 = 0.259W$ $\quad P_{R2} = I_{L2}^2 * R_2$
$P_{R3} = (0.37^2) * 200 = 0.274W$ $\quad P_{R3} = I_{L3}^2 * R_3$

P_R total = $P_{R1} + P_{R2} + P_{R3} = 0.245 + 0.259 + 0.274 = 0.778W$
-or- 778mW

$P_{L1} = 3.0 * 0.035 = 0.105W$ $\quad P_{L1} = V_{f1} * I_{L1}$
$P_{L2} = 2.8 * 0.036 = 0.101W$ $\quad P_{L2} = V_{f2} * I_{L2}$
$P_{L3} = 2.6 * 0.037 = 0.096W$ $\quad P_{L3} = V_{f3} * I_{L3}$

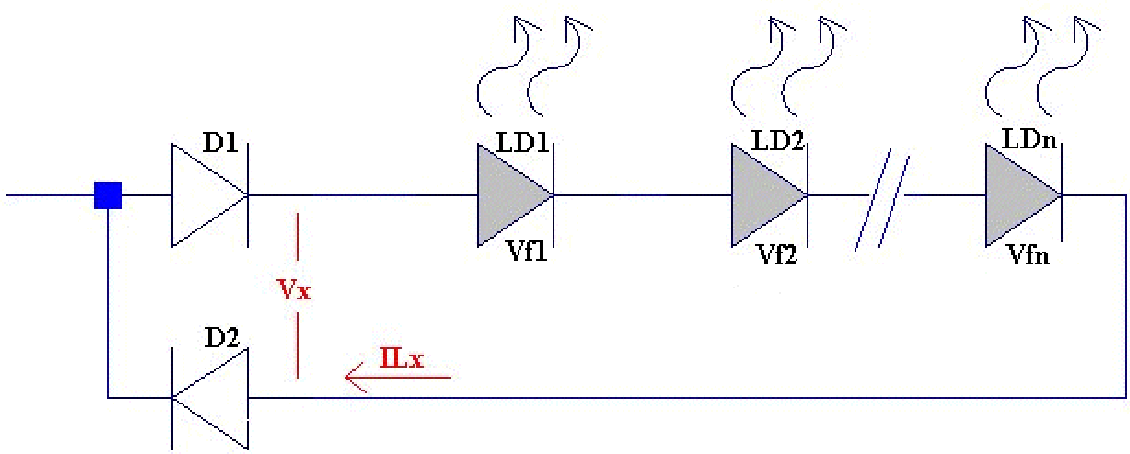
P_L total = $P_{L1} + P_{L2} + P_{L3} = 0.105 + 0.101 + 0.096 = 0.302W$
-or- 302mW

Without a doubt we are wasting over twice the energy in the limit resistors, 778mW with the LED’s consuming a small 302mW.

We also see in Fig: 2 that the configuration is more complex and requires additional parts, the resistors, resulting in a higher connection and component counts right alongside with the wasted energy in the resistors.

An Optimal Configuration

Fig: 3



In Fig: 3, I show one of the optimal ways in which to utilize LED arrays driven from Exciters. What you see in Fig: 3 is a simple series driven string of the LED’s. There are no limiting resistors to waste energy and the Exciter and AV Plug see's a much higher impedance than would be provided by the circuits show in either Fig: 1 or 2.

Because Exciters prefer high load impedances, V_x in Fig: 3 is able to reach values in the hundreds of volts, provided there is a sufficient number of LED's in the series string. The maximum voltage that will be developed is found by the addition of all of the forward voltages for all of the LED's in the series load string.

Ideally if all the LED's presented the same V_f and we used three LED's in series, with each LED having a V_f of 3.0 volts we could calculate the maximum voltage in the following way.

(F)

$V_x = 3.0 + 3.0 + 3.0 = 9.0$ volts $\qquad V_x = V_{f1} + V_{f2} + V_{f3}$

This relationship will hold to many hundred volts when Exciters are operating in Coherence Mode, therefore the following example is also valid for V_x.

(G)

40 LED's with a $V_f = 3.0$

$V_x = 3.0 * 40 = 120$ volts

What is the limit of V_x?

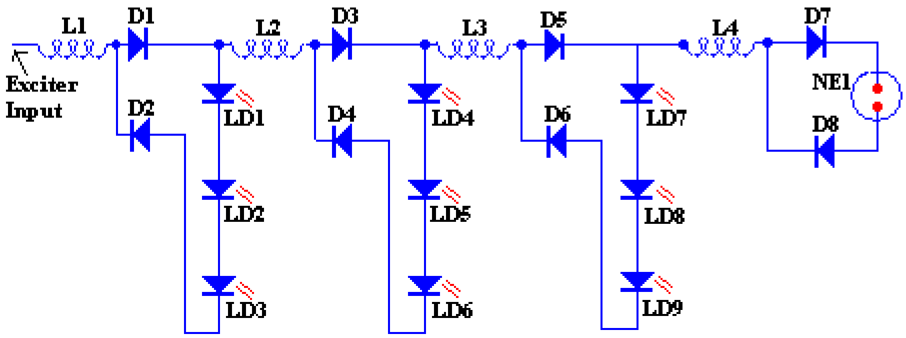
This question can only answered in a complex way because of all the variables that affect the potential maximum value of V_x, some of which are; (1) The Exciter source voltage, (2) The impedance of the load driven by the Exciter, (3) The inductances used in the Exciter, (4) The Bandwidth of the Exciter and (5) The degree of Coherence achieved.

Before continuing I must point out one particular drawback for a circuit configuration as shown in Fig: 3, it is indeed a series circuit and the circuit must be intact or the entire circuit will fail. This is a valid drawback, although after years of research using similar configurations, I have found that in 99% of LED failures, they 'short' rather than 'open'. What this means is that the circuit remains intact and all remaining functional LED's will continue to produce output and the shorted unit of course does not.

This is not the only answer of course as there are actually fifteen different parameters affecting Exciters performance, along with the fact that when Coherence is taking place, it is possible to multiply the effect as shown in the following circuit.

The circuit shown in Fig: 4 was implemented in the research and demonstration Exciters, Model 15-20, which was made available to researchers in 2007. The circuit configuration utilizes the constant current phenomenon presented during Coherence and further utilizes chained voltage generation to restore the initial Exciter output voltage, thereby presenting a series of constant current and constant voltage Coherence segments.

Fig: 4



Without going into a detailed explanation of the SEC Theory [2] in this paper, the operation of the circuit in Fig: 4 can be described in the following overview.

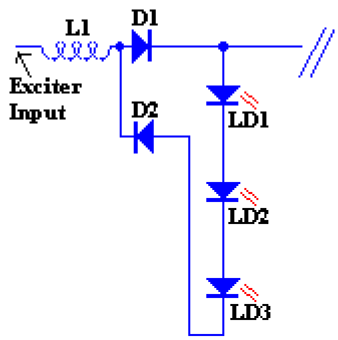
On the left of L_1 is the input from the Exciter, L_1, D_1 and D_2 form the first power stage, which is supplying voltage, and current to LED's LD_{1-3} followed by the second stage composed of L_2, D_3 and D_4 powering LD_{4-6}. One must understand that the current flowing through D_5 at the end of the chain is the same value as the current flowing through D_1 at the beginning of the chain. But, if L_2, L_3 and L_4 are not present, the voltage across the Neon NE1 will not equal the voltage at the input to D_1.

The purpose of L_2, L_3 and L_4 is to maintain the same voltage input to each powered segment of LED's, yet this can only occur if the circuit is in Coherence Mode.

The number of segments that can be supported by a configuration as shown in Fig: 4, is in theory unlimited, yet because Coherence is governed in part by the excitation output of the Exciter, any one Exciter will not support unlimited stages, rather the Exciter must also be increased in Excitation to support a very large number of stages. Also the number of LED's supported by each segment is not limited to just three as show in the example,

To conclude with Fig: 4, a segment is composed of; an inductor, two diodes forming an AV Plug and a number of LED's as indicated in Fig: 5.

Fig: 5



Summary

Over the last nine years my research direction was to obtain Coherence and sustain a CEC>1. Today after all the work I have reached this point, yet it can only be realized by the proper design of the loads placed on the Cohering Exciters.

It is not yet possible and may never be possible to place every type of electrical load on an Exciter and still maintain Coherence. That although seems to be a small problem as it was never envisioned that the SEC Theory would be the one and only Holy Gail in alternative energy. Looking into the future it seems less of a concern if Exciters can only become accepted as Light Sources as this in itself would be a milestone.

In the Spatial Energy Coherence Theory, I explain why SEC Exciters do not conform to the so-called acid test of a true CEC>1 device and once this is understood and researchers move their focus from self-running devices to load design and interface problems that still prevent the full utilization of Cohered Energy, the possibility of SEC may indeed become a common electrical device used by everyone with energy output far exceeding the square of input now realized.

References

[1] LED or Light Emitting Diode is now a common solid state replacement for many lighting applications ranging from but not limited to; Portable Lights of all types, Emergency Light Sources, Auto and Street Warning lights, Home and Business lighting applications. LED's are commonly known for their low input energy to high light output characteristics and a long operational lifetime, which can be in excess of 100,000 hours.

[2] Spatial Energy Coherence or commonly referred to as SEC is a Theory developed by Dr. Ronald Stiffler on the Coherence of energy from the Energy Lattice [4] which is the underlying power source for the Universe as we know it.

[3] A SEC [2] Exciter is a specially designed Ultra Wideband Oscillator conceived of and designed by Dr. Ronald Stiffler, which is able to exhibit Spatial Energy Coherence [2] during its operation.

[4] The Energy Lattice is the underlying structure or foundation, which powers the Universe. It is called a Lattice because it is composed of a near infinite number of Energy Nodes, which are tied or joined to each adjoining Energy Node by Bonding Conduits, forming a lattice type arrangement.

[5] CEC or 'Cohered Energy Coefficient'. Derived from a simple analysis of Output Energy divide by Input Energy, or CEC = U_{out}/U_{in} and results in a CEC number indicating the efficiency of the circuit or system being analyzed. U is normally a quantity measured in Joule Seconds, Watt Hours, Kilowatt Hours, BTU's, Calories or Lumens.

[6] S. V. Avramenko , AV Plug, see; "The Measuring of Conduction Current That is Stimulated by Polarization Current", published in the 'Journal of Russian Physical Society, No# 2, 1991'. Also see Single Wire Power Transmission http://www.alternativkanalen.com/s-wire.htm