Energy Gain with Classical Electromagnetism

This paper is to explain the apparent energy gain using my RLE (Reduced Lenz Effect) technology with conventional circuitry in a proper configuration.

To begin, we'll examine the simulated circuit shown in Fig1.

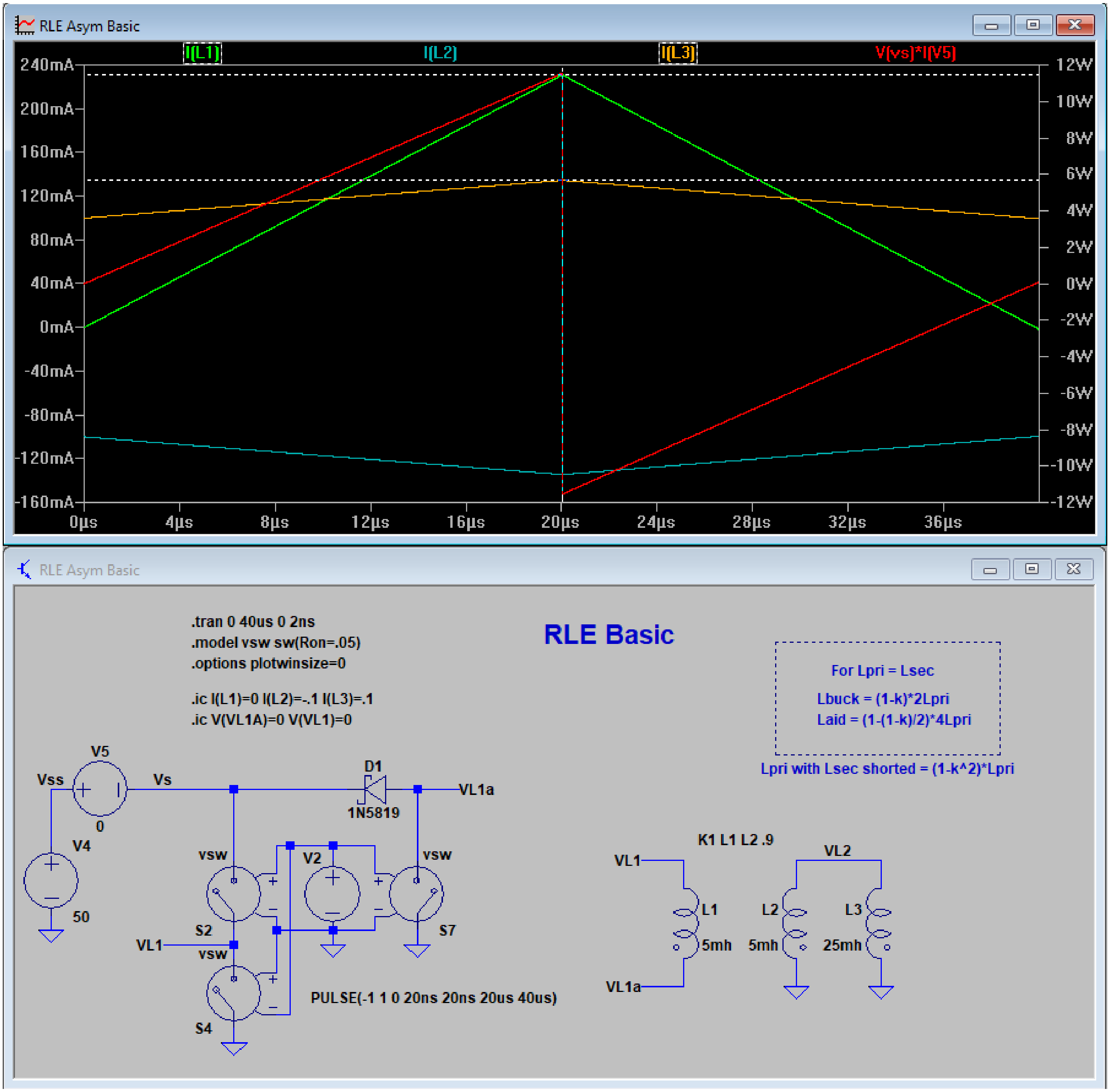

Figure 1

Here we have a transformer with a primary L1 and secondary L2 with a coupling factor of k=.9 . The secondary L2 is loaded with a relatively constant current inductor L3 which allows a near reduction of the Lenz effect relative to L1. The circuit performs no useable function except to demonstrate the increase in current in L3 during the charging of L1 and the decrease in L3's current during the discharge of L1 to the supply Vs due to the change in emf in the secondary. The overall COP of this circuit is obviously <1 .

Next, we'll look at the same circuit in Fig2 with a modification in that L3 is clamped when it reaches a peak current at 10us.

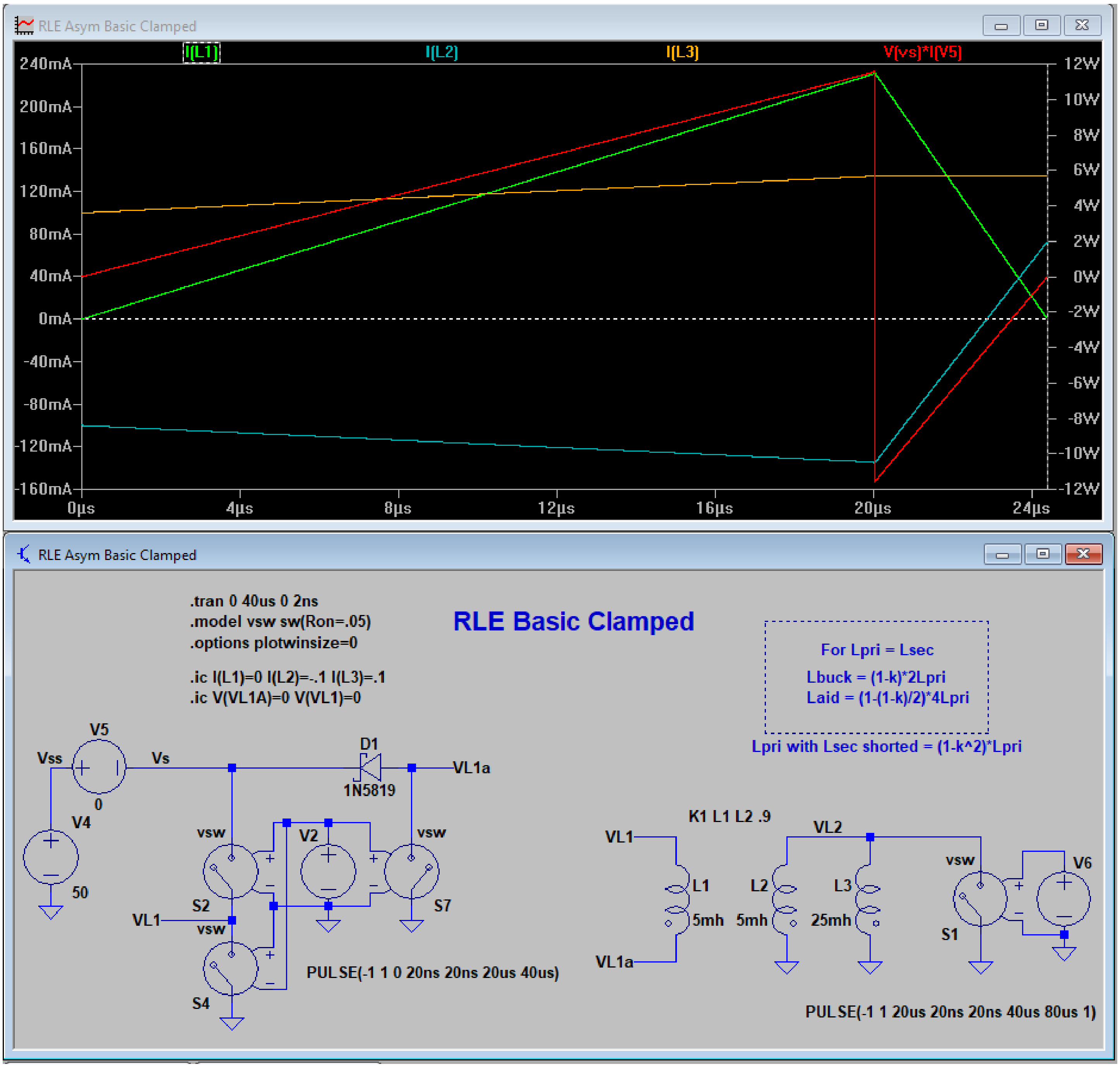

Figure 2

Now we see a distinct difference in the time required for the falling currents in L1 and L2 during the collapse or discharge of L1. The reason for this is the fact that L2 is now shorted which reduces the inductance of the primary L1 to Lpri' = (1-k^2)*Lpri = 950uH neglecting losses . Looking at the plot data in Fig3 below, we see that with the supply of 50v dc, L1 decreases 231.4ma over 4.362us for an apparent inductance of 942uH .

We can also calculate the effective energy levels from the plot data. To calculate the energy gain and/or loss in L2, and L3, we use the starting and ending currents respectively for one complete cycle. L1 starts and ends with zero current so is eliminated from the calculations.

UL2 = (.1^2-.0731^2)*.005/2 = 11.64uJ (loss)

UL3 = (.1344^2-.1^2)*.025/2 = 100.8uJ (gain)

Uin = 90.355uJ (loss)

So, the overall apparent COP = 100.8e-6/(11.64e-6+100.8e-6) = .988 which is efficient but obviously conservative.

RLE Basic Clamped Data

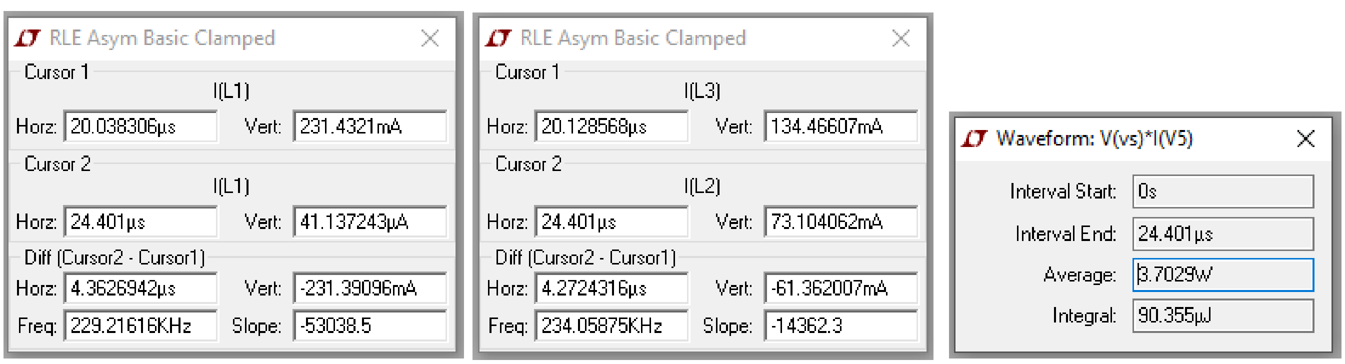

Figure 3

Now we will examine a circuit simulation in Fig4 which was conceived after due consideration and analysis was done on the above result. The overall goal was to equalize the charge and discharge energy levels of the primary L1 as much as possible. This was accomplished by reducing the coupling or k factor to .15 in this example. Now we should have an approximate L1 inductance of 80mH during the charging phase (it will actually be slightly less due to the imperfect constant current sourcing of L5) and ~(1-.15^2)*.08 = 78.2mH during the discharge phase. The result of this is that most of the charging energy for the primary L1 will be returned to the supply during the discharging of L1. If one requires a "gain mechanism", this is it's equivalent along with the advantage of the RLE concept.

In order to produce a reasonable secondary emf with such a low coupling factor of .15, it required a high supply voltage and larger primary inductance be used as seen in this example but definitely not limited to these parameters.

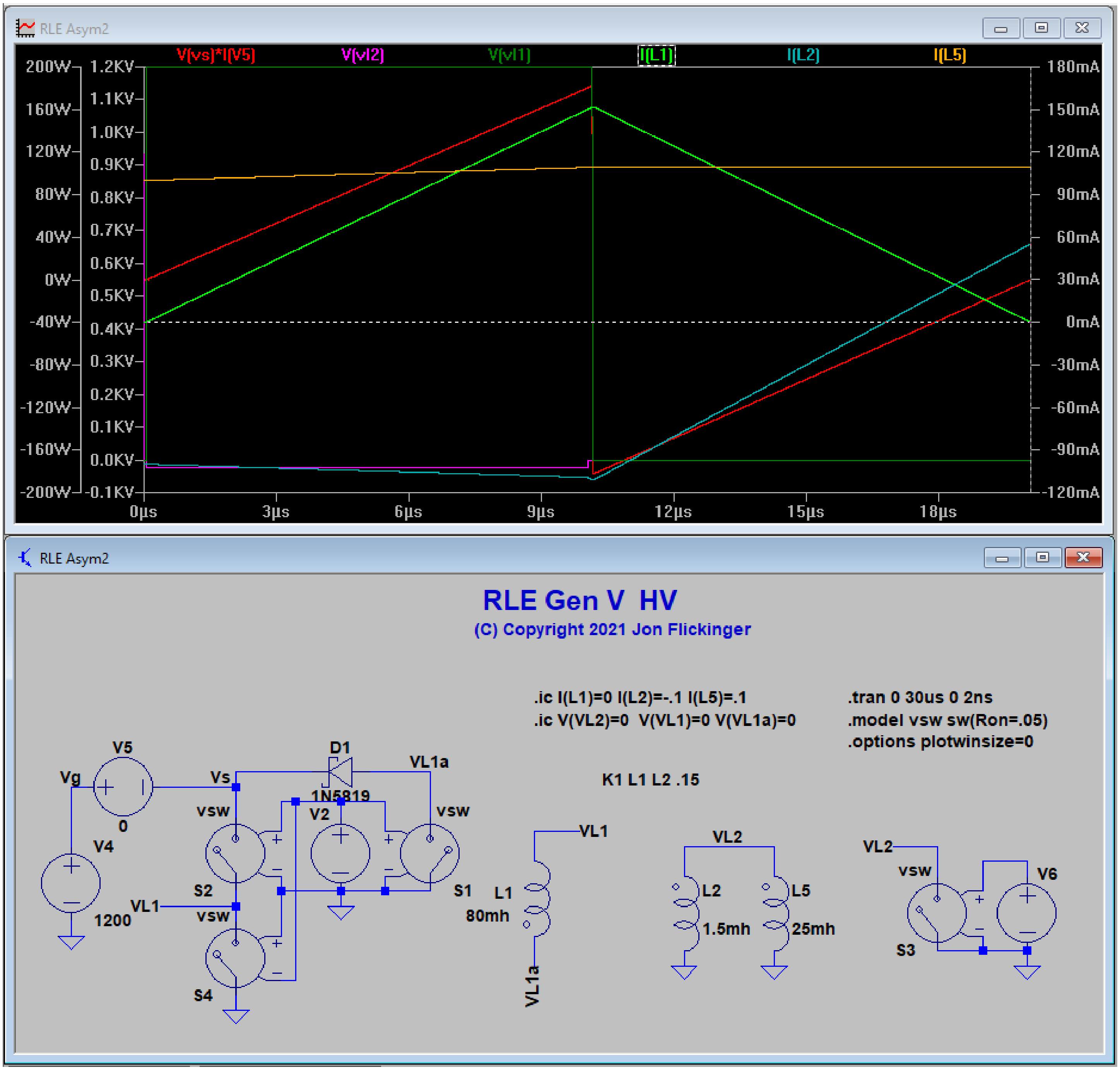

Figure 4

Now we will look at the energy levels from the plot data similarly as done for the sim inFig2. Again L1 starts and ends with zero current so will be neglected. Note that the current in the secondary L2 reverses which is customary with this design so the magnitudes will be used in the calculations below.

Also note that the change in current for the primary L1 is 151.4ma over the discharge time of 10.1us for an apparent inductance of ~80mH.

$UL2 = (.1^2-.0554^2)*.0015/2 = 5.198uJ$

$UL5 = (.10925^2-.1^2)*.025/2 = 24.196uJ$

$Uin = 11.936uJ$

So, the apparent COP = $24.196e-6/(5.198e-6+11.936e-6) = 1.412$

Resistive losses are ignored for the above calculations.

RLE HV1 Data

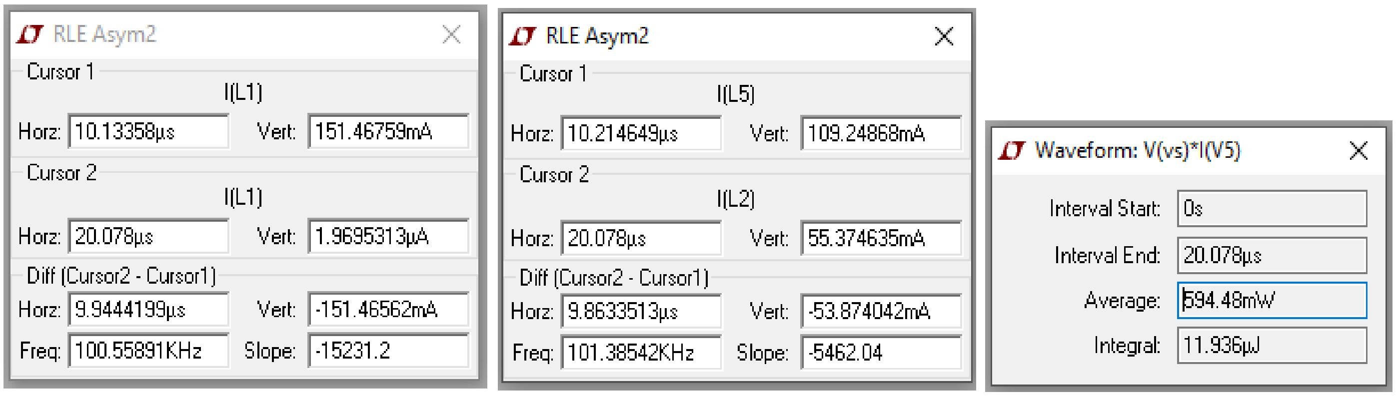

Figure 5

As can be seen, the energy and resultant power levels are small but never-the-less demonstrate that an energy gain is possible within classical electromagnetism.

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