Energy from spacetime based on the parametric oscillator: application of the Ide device

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Abstract

A special parametric oscillator is designed utilizing the Ide effect (additional current at hard switch-on of a transformer). According to preceding papers, this current is a consequence of an oscillation of inductance before it reaches its static value. The oscillation is utilized as a parameter change in a serial or parallel oscillator circuit. Simulation results show an exponential growth of the current even in presence of an ohmic resistance. Concerning the energy balance, the output energy highly exceeds the input energy taken from the power source. Modifications of the circuit are investigated which avoid short cuts during switching of the power source. An inductive coupling of input is of limited useability, except the capacitor is moved to the primary side of the circuit. Experimental tests should be executed to prove the concept being well engineerable.

Keywords: serial and parallel resonance circuit; parametric oscillator; initial current; circuit theory; variable inductance; simulation model.

1 Introduction

The understanding of parametric oscillators has significantly been improved in the last years by the joint work of the AIAS Institute and the Munich Group of experimentalists. As described in detail in [8, 9], a parametric oscillator is a serial or parallel resonance circuit in which at least one element has variable device parameters in time, for example a capacitor or an inductor. When driven conventionally, these oscillators are devices operating according to conventional circuit theory. The energy earned from the circuit has to be fed in by changing the parameters of the device and there is no extra power output. However such devices are candidates for gaining energy from spacetime. The salient point is to find a mechanism for gathering energy in a non-conventional way. To realize this, the mechanism found by Osamu Ide is proposed [1]- [4]. The hard switch-on of a transformer gives a current not explainable by conventional circuit theory. This effect was described nearly perfectly by a model based

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on ECE field theory [5]- [7] of the the AIAS Institute and turned out to be a principal mechanism suitable for obtaining energy from spacetime. We combine this approach with the parametric circuit. Simulation results show that an energy gain is possible in this way. In contrast to many other attempts in the field of alternative sources of energy, this approach can quite well be understood by theory as well as experiment and is engineerable.

When a voltage is applied to a serial resonance circuit, it is known from classical electrodynamics that the current rises first linearly and then goes into saturation. The inductance of the circuit hinders the current to jump to its final value immediately. In a series of papers, Osamu Ide has described experiments revealing an extra current in this process [1]- [4]. Actually there are two effects. When voltage is switched on in a pulse, the current oscillates strongly for less than a microsecond, then rises beyond the classical (linear) value in an exponentially decreasing way. Both effects could be explained as interactions with the background or spacetime potential, which becomes effective in non-continuous processes, in this case the hard-flanked switch-on of the voltage.

A simplified approach for explanation was derived which is based on an extension of classical circuit theory [10]. Both the experimental and theoretical results showed that the modulation of circuit behaviour due to spacetime effects results in a strong variation of the effective inductance. Therefore we will utilize this behaviour in the following as the 'parameter' of the parametric circuit.

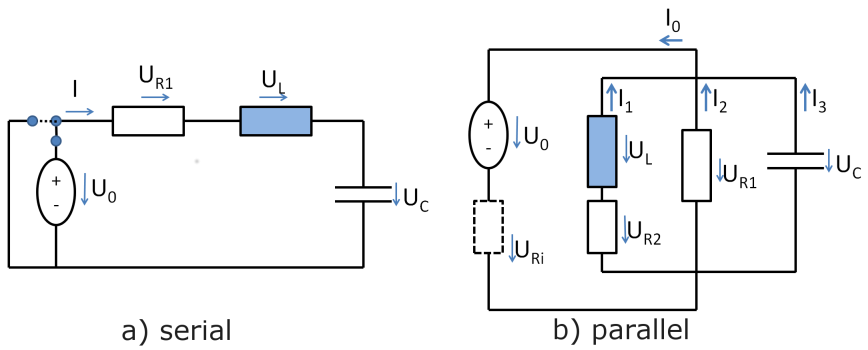

Figure 1: Serial (a) and parallel (b) resonance circuit.

2 Analytic curcuit theory

2.1 Serial resonance circuit

For a serial resonance circuit as shown in Fig. 1(a), the voltage rule of the Kirchhoff laws reads

$$U_L + U_R + U_C = U_0. \tag{1}$$

Therefore the general serial resonance circuit with inductance L, capacitance C, Ohmic resistance R, obeys the circuit equation

$$\frac{d}{dt}(LI) + RI + \frac{Q}{C} = U_0 \tag{2}$$

where Q is the charge at the capacitor and I the current. Normally the device properties L, R and C are assumed constant in time. For a non-constant inductance follows (see [10]):

$$\frac{dL}{dt}I + L\frac{dI}{dt} + RI + \frac{Q}{C} = U_0, \tag{3}$$

or, written with the dot for the time derivative:

$$\dot{L}I + L\dot{I} + RI + \frac{Q}{C} = U_0 \tag{4}$$

with the definition equation

$$I = \dot{Q}. \tag{5}$$

The model for the time-dependence of inductance is

$$L = L_0 \left(1 - \exp(-\frac{t_1}{T_1}) \sin(\omega_2 t_1)\right). \tag{6}$$

This is an exponential decay modulated by a periodic function. The time t_1 starts from zero at each switching point of the voltage U_0. The time constant of the decay is T_1, set to 1 μs. ω_2 is the oscillation frequency of 'ringing', chosen as $2\pi \cdot 2$ MHz. L_0 is the static inductance which is the asymptotic value of the oscillating phase. The resonance frequency is determined by the capacity C and asymptotic inductance L_0:

$$f_1 = \frac{1}{2\pi} \frac{1}{\sqrt{L_0 C}}. \tag{7}$$

As explained in [9], the parameter of the parametric oscillator has to be changed dynamically. In this case the voltage U_0 is switched at instances of time where signs of capacitor voltage and current take the same sign:

$$U_0 = \begin{cases} 0 & \text{when } (U_C \geq 0 \text{ and } I \geq 0) \\ U_1 & \text{when } (U_L < 0 \text{ and } I < 0) \end{cases} \tag{8}$$

where U_1 is the fixed voltage of the power source.

2.2 Parallel resonance circuit

Using Kirchhoff's node current method for the parallel circuit (Fig. 1(b)) gives:

$$I_1 + I_2 + I_3 = I_0 \tag{9}$$

and Kirchhoff's mesh rule:

$$\frac{d}{dt}(L\, I_1) + R_2 I_1 = L\, \dot{I}_1 + \dot{L}\, I_1 + R_2 I_1 = U \tag{10}$$

with definitions

$$I_2 = \frac{U}{R_1} \tag{11}$$

$$\frac{Q_3}{C} = \frac{1}{C}\int I_3\, dt = U. \tag{12}$$

Taking the time derivative of the third equation, we end up with the equation set

$$I_1 + I_2 + I_3 = I_0 \tag{13}$$

$$L\dot{I}_1 + \dot{L}I_1 + R_2 I_1 = U \tag{14}$$

$$I_2 = \frac{U}{R_1} \tag{15}$$

$$I_3 = C\,\dot{U} \tag{16}$$

which are four equations for four unknowns I_1, I_2, I_3, U. The current I_0 is the driving current. It may be difficult to realize a pure current source for I_0 experimentally. When the driving current is to be obtained from a driving voltage U_0, it may be obtained by

$$I_0 = \frac{U_0}{R_i} \tag{17}$$

where R_i is the inner resistance of the voltage source. Based on the conditions for a variable inductance, the voltage U has to consist of rectangular pulses as well as I_0. It may be difficult to realize this condition for a parallel resonance circuit. Therefore we restrict consideration to serial resonance circuits in this paper.

3 Simulation results

3.1 Serial resonance circuit

The parametric oscillator described in section 2.1 has been simulated by an OpenModelica model [11]. In order to obtain a resonance behaviour (i.e. increasing voltage and current amplitudes), it is important to implement the dynamic switching of Eq.(8). Otherwise it is difficult to get this behaviour without extensively adjusting the resonance frequency. This can be seen from Fig. 2 where the switched voltage source U_0 is graphed. the pulse width is small at the beginning and then broadens to the expected 50% of the period. Only this self-regulation leads safely to the wanted behaviour. In addition, in Fig. 2 the voltage U_R at the resistance is shown which is in phase with the current. It can be seen that U_R – and therefore the current – is in phase with the flanks of U_0 and has strong spikes at these instances of time due to the hard switching. The paremeter used for simulation are:

$$U_0 = 50 \text{ V}$$
$$C = 1 \text{ pF}$$
$$L_0 = 0.004 \text{ H}$$
$$R = 20\ \Omega$$
$$f_1 = 79.5 \text{ kHz}$$
$$T_1 = 1\ \mu s$$
$$\omega_2 = 2\pi \cdot 2 \text{ MHz}$$

The time dependence of variable inductance L (Eq.(6)) and current I is shown in Fig. 3 on an extended time scale. There is a correspondence between the oscillations in L and oscillating peaks in I. The energy input to the circuit is given by

$$E_{in} = \int U_0 \, I \, dt \tag{18}$$

and the output energy is the energy dissipated by Ohmic losses:

$$E_{out} = E_R = \int R \, I^2 \, dt. \tag{19}$$

Both quantities are graphed in Fig. 4. Since the current always flows back into the source, the input energy is very small. The dissipated energy increases exponentially, showing the characteristic of this parametric oscillator. A conventional circuit cannot behave in this way because of the Ohmic resistance. This is a true overunity device.

3.2 Modified serial resonance circuits

As an extension of the simulation with ideal elements, we first introduce a saturation of the inductor. The effective inductance then depends on the current and decreases significantly when the core of the inductor undergoes magnetic saturation. In a classical resonance circuit (see Fig. 5) the current amplitued reaches a maximum with an ideal inductor (red curve). As soon as the saturation effect of the core is included (blue curve), the current decreases and stays at a lower asymptotic value.

To introduce this physical behaviour into the parametric oscillator, we used an analytic form of asymptotic L_0 presented in Fig. 6. As a result, the oscillations of L continue to exist, but the mean value decreases from 0.004 to 0.002 H. The simulation result with this type of inductor is graphed in Fig. 7. The oscillator now behaves opposite compared to a conventional resonance circuit. Instead of showing a saturation effect, the current further increases widely beyond the values obtained for the ideal inductor. Both cases are displayed in Fig. 7. The efficiency of the device can be increased remarkably by operating it in saturation mode of the magnetic core.

Next we compare three variants of the circuit in Fig. 1a. The calculations were done with a fixed frequency $f = 1.05 \; f_1$ for the pulsed voltage. Other parameters are as before with additionally

$$R_1 = 20 \; \Omega,$$
$$R_2 = 10 \; \mathrm{k}\Omega.$$

The results showed that in these cases the dynamic switching according to Eq.(8) is not required (and in some cases produced problems with the simulator). We define the efficiency u of the circuit by

$$u = \frac{E_R}{E_{in}} \tag{20}$$

where E_R is the sum of all Ohmic resistance contributions. Another definition would be to use the ratio of input and output power but this produces large spikes so that the above definition is more significant and better suited for comparison. The circuit of Fig. 8a is the original circuit where the voltage has been placed in parallel to the resistance. This limits the current when the switching transistor is open, there is no shortcut anymore. As a drawback, the resonance is damped, but as the red curve in Fig. 9 shows, the exponential characteristic remains.

In Fig. 8b and 8c the coupling to the resonance circuit is inductive by a transformer. The efficiency depends highly on the choice of resistances R_1 and R_2. For a real system, a parameter study has to be done to find the optimal values. Fig. 9 shows that for circuit 8b the efficiency remains reasonable while it barely exceeds unity for circuit 8c. (The value for 8c is negative due to a different phase behaviour, only the modulus of u is relevant.) In variant 8d the capacitor has been moved to the primary side, thus the resonance circuit is completely at primary side, only power is extracted secondarily. The curve u(d) in Fig. 10 (graphed separately because of different time scale) shows that this is the best choice of circuit design. The efficiency rises exponentially again. As already stated, these pictures may look differently for other resistance values.

4 Conclusions

It was shown that energy from spacetime is possible if a non-standard mechanism is applied to alter a parameter (i.e. physical property) of a parametric oscillator. Such oscillators are known since the 1930ies but were very difficult to analyze because lack of solvable mathematical models. Therefore they are not mentioned in standard text books of electrical engineering and most engineers never heard of this during their university studies. With the advent of numerical methods, however, such model equations can be solved nearly without problems. We did this extensively for this article, showing that such an oscillator - although formally identical to a standard resonance circuit concerning the cirucit diagram - behaves completely differently, leading to an undamped resonance. Saturation effects of the inductor do not diminish the resonance but even give an additional boost. Introduction of additional resistances is possible in order not to damage switching transistors. The obvious idea of driving the circuit by an inductive coupling of the power supply unit is of limited use. It is much better to decouple the load from the circuit by a transformer, while the load resistance must be high compared to the resistance on the primary side. There may be a lot more possibilities for realizing this than investigated in this work.

In future work the circuits will have to be constructed and tested. An indispensable feature is the occurrence of the Ide effect. This is the mechanism of transferring energy from spacetime to the real hardware. It is not fully clear at the moment if the voltage peaks at the inductance are sharp enough to evoke the Ide effect in all investigated circuit variants. In addition, the mechanism has to be made scaleable so that lower resonance frequencies and bigger devices can be employed, producing a higher power output. If all this works well, very high overunity factors can be achieved.

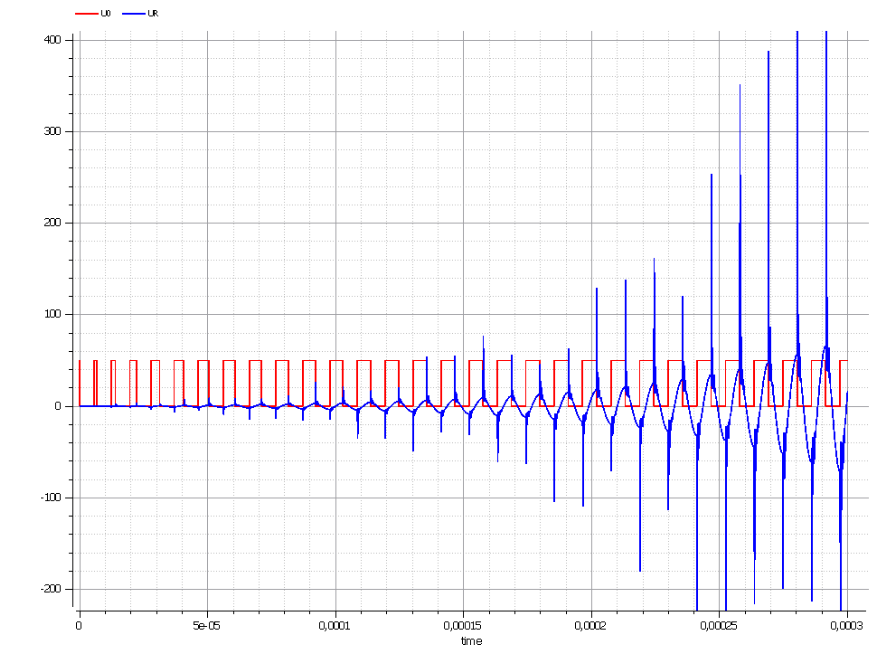

Figure 2: Switched voltage source U_0 and voltage at ohmic resistance U_R in the serial parametric oscillator.

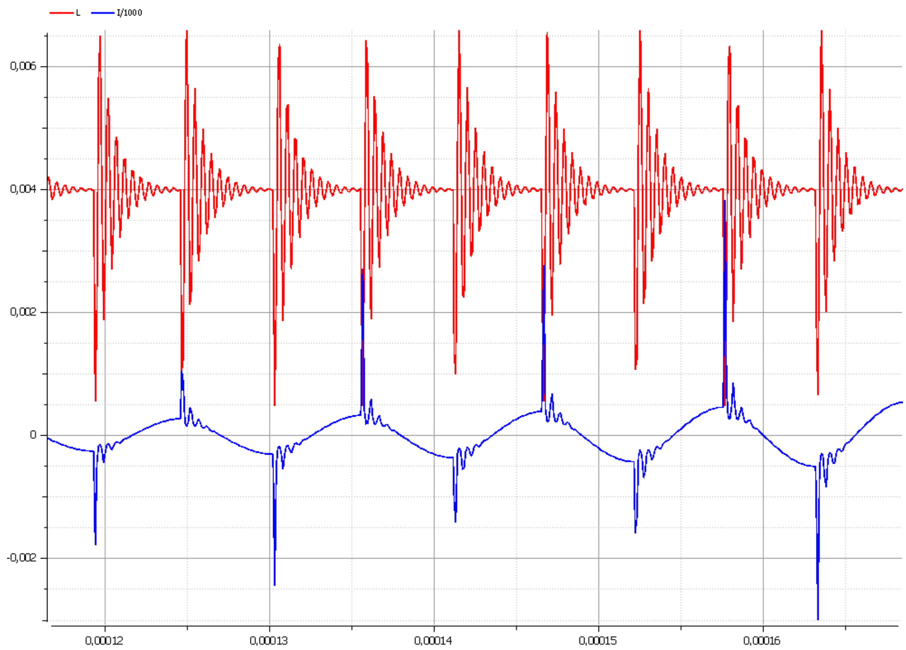

Figure 3: Variable inductance L and current I in an enlarged time slot.

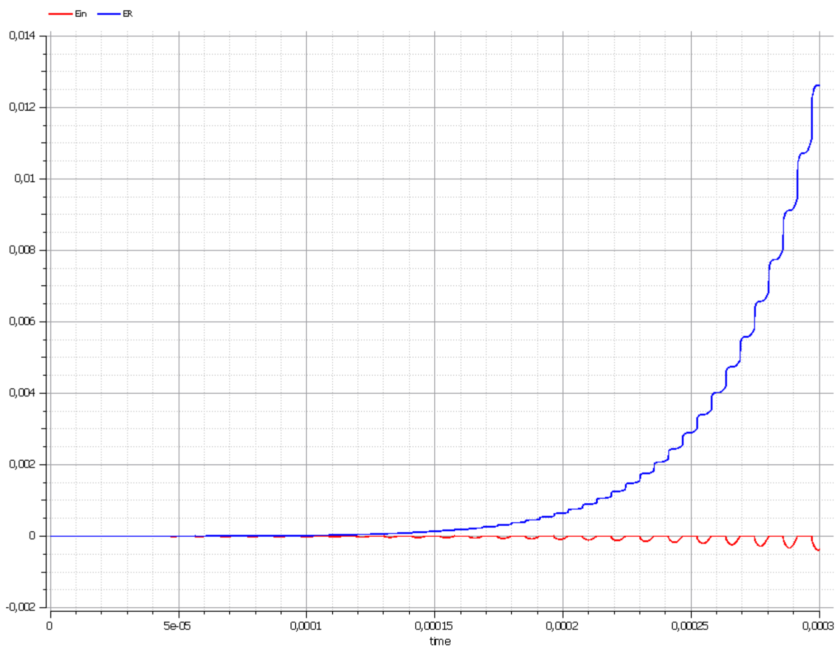

Figure 4: Input energy E_{in} and dissipated ohmic energy E_R.

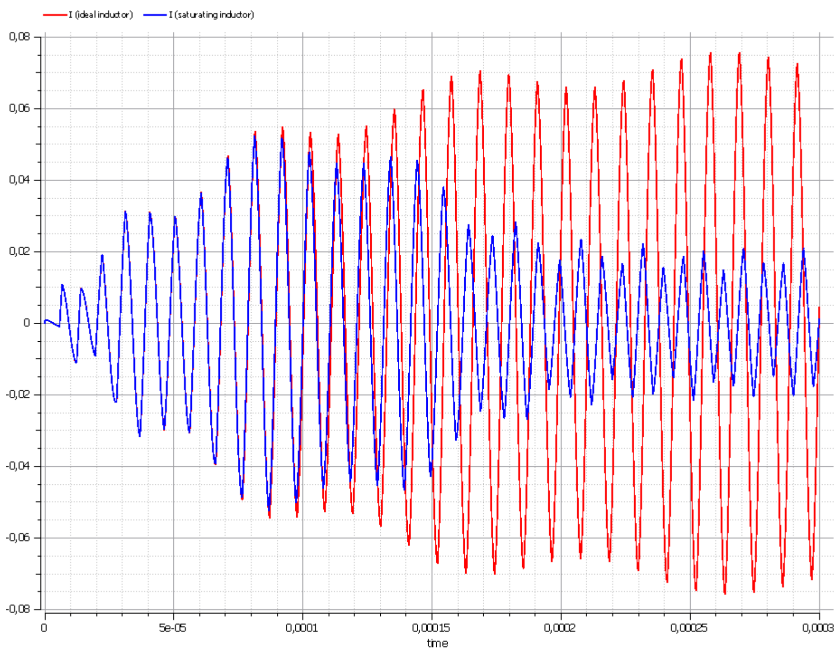

Figure 5: Current of an ideal inductor (red) and saturated inductor (blue) for an ordinary serial resonance circuit.

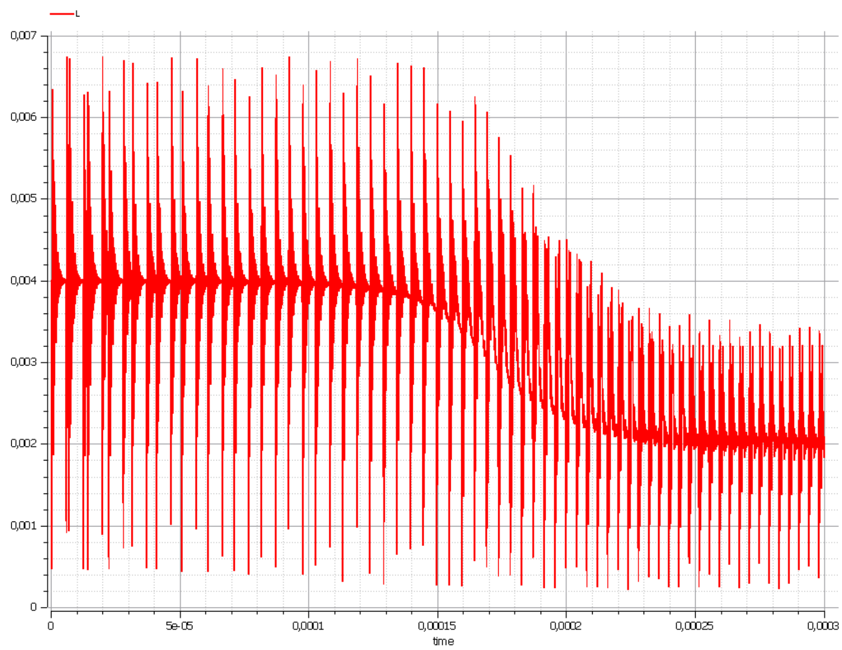

Figure 6: Saturation effect of inductance L over time.

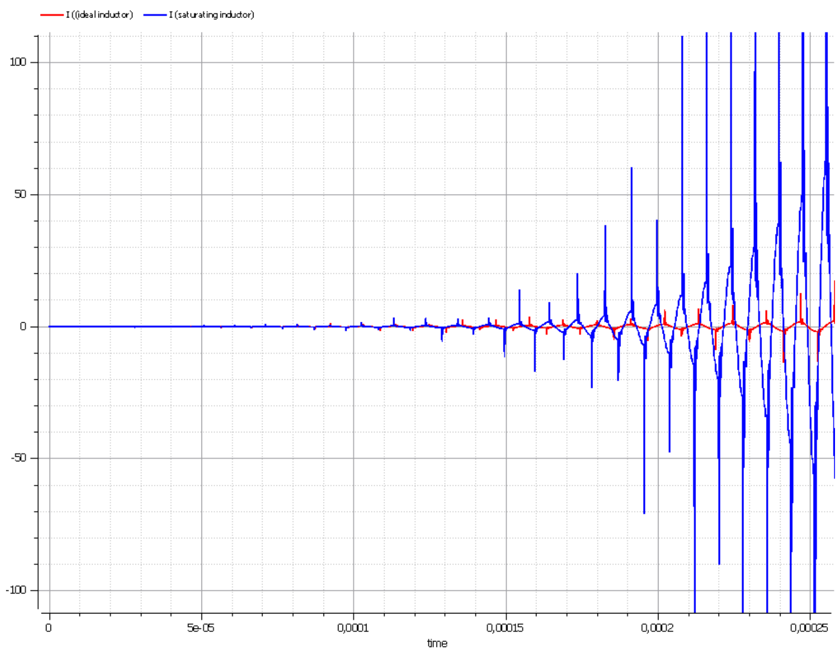

Figure 7: Current of an ideal inductor (red) and saturated inductor (blue) for the parametric resonance circuit.

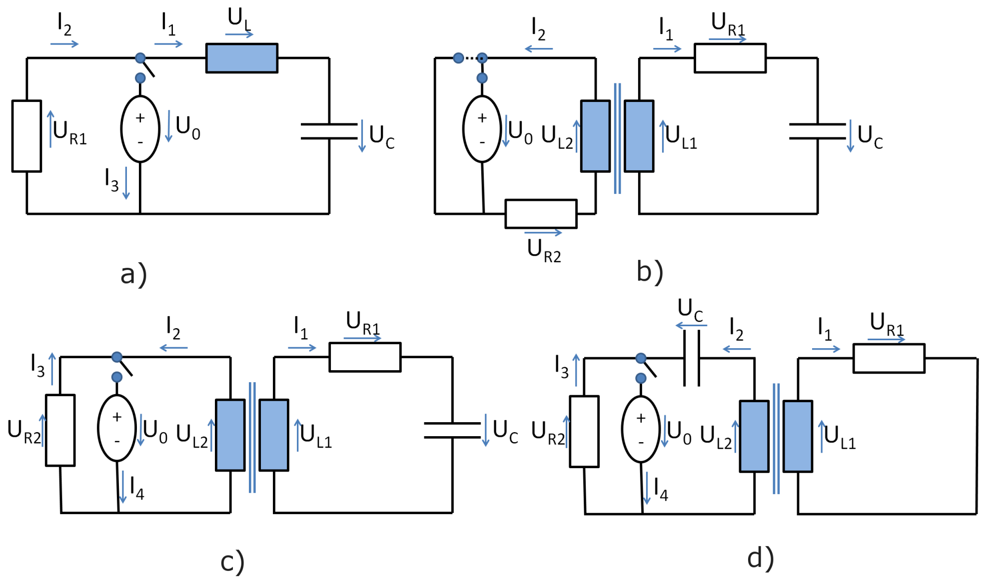

Figure 8: Variants of the parametric oscillator circuit. a) source position modified, b) inductive coupling for Fig. 1a, c) inductive coupling for (a), d) oscillator completely in primary circuit.

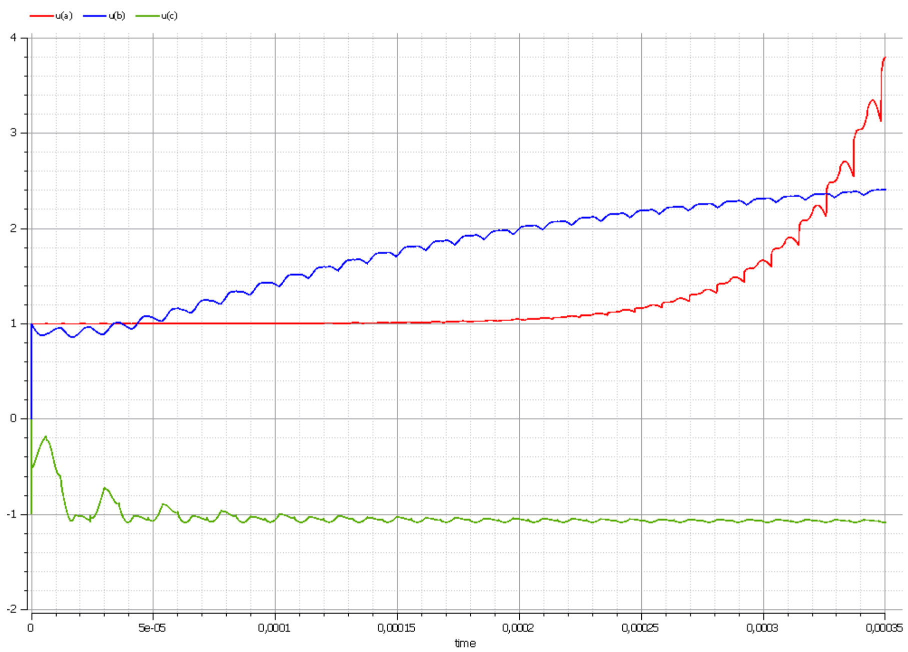

Figure 9: Efficiency u for circuits of Fig. 8a-c.

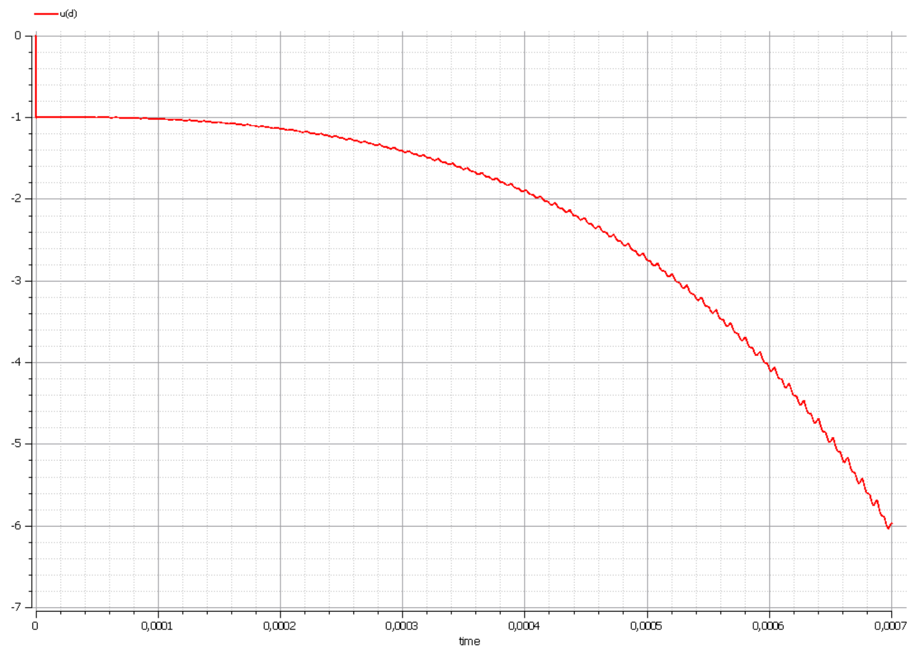

Figure 10: Efficiency u for circuit of Fig. 8d.

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