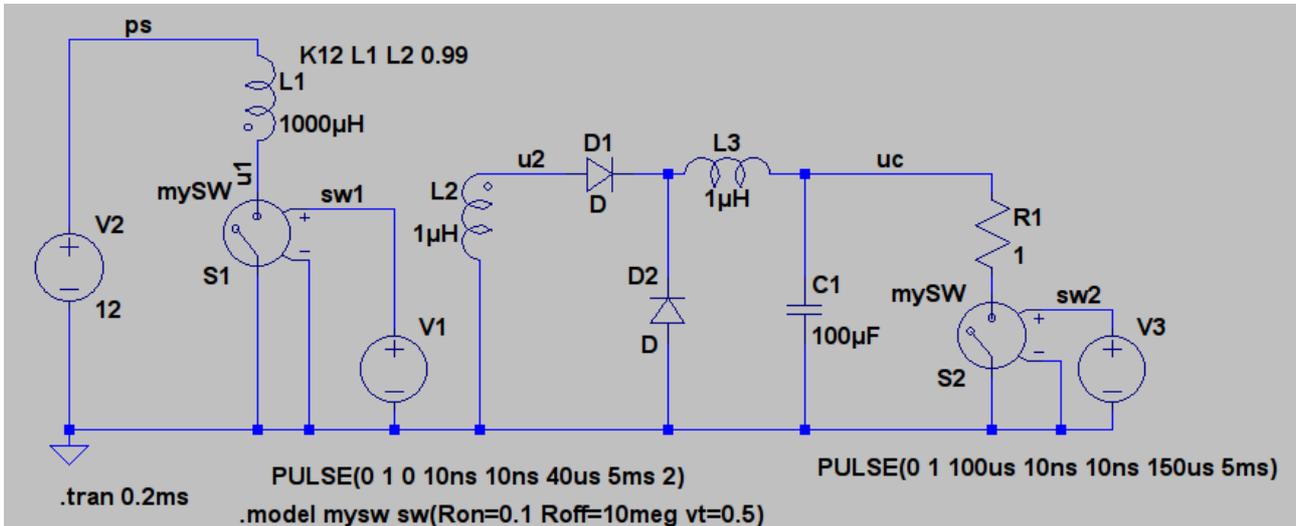


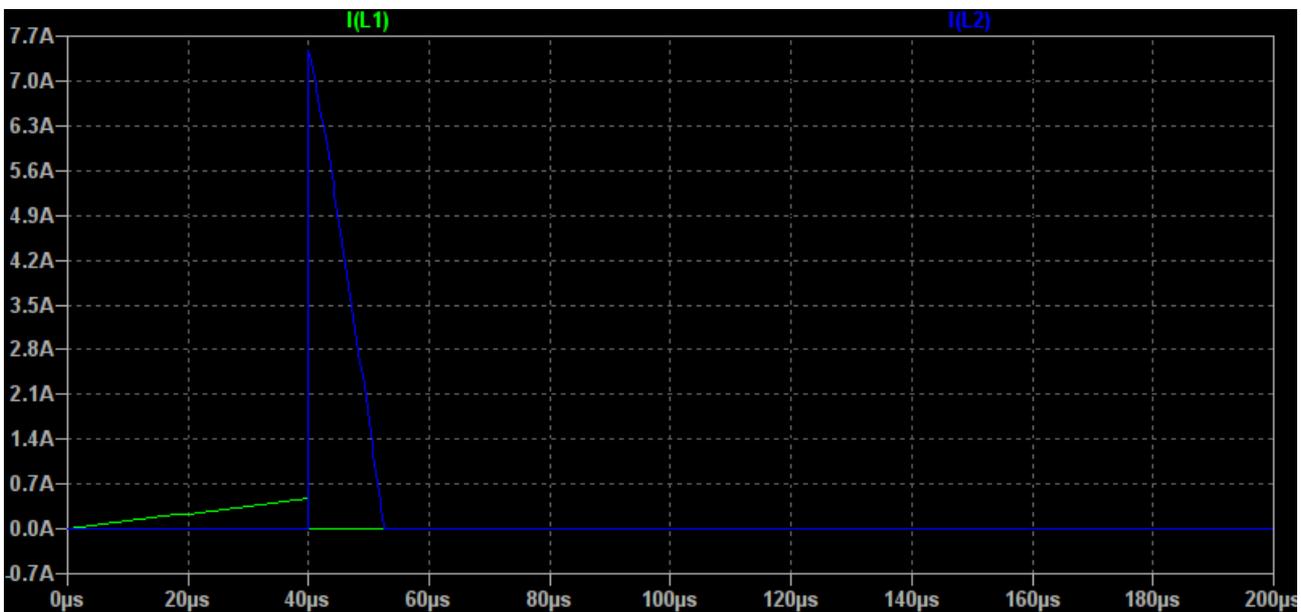
Observing negative resistance

Here proposed very simple approach to demonstrate possibility of creating negative resistance in coils with ferrite core and obtaining some extra power with it.

Step-down flyback transformer L1L2 used to produce very short (about 1us) and very high current pulses (up to 100a in test were possible). These pulses feed through coil with ferrite core L3 and magnet into capacitor C1. Capacitor periodically discharged through R1 / S2 to maintain initial voltage on capacitor.



pic. Model of experimental setup (model does not take negative resistance into account)



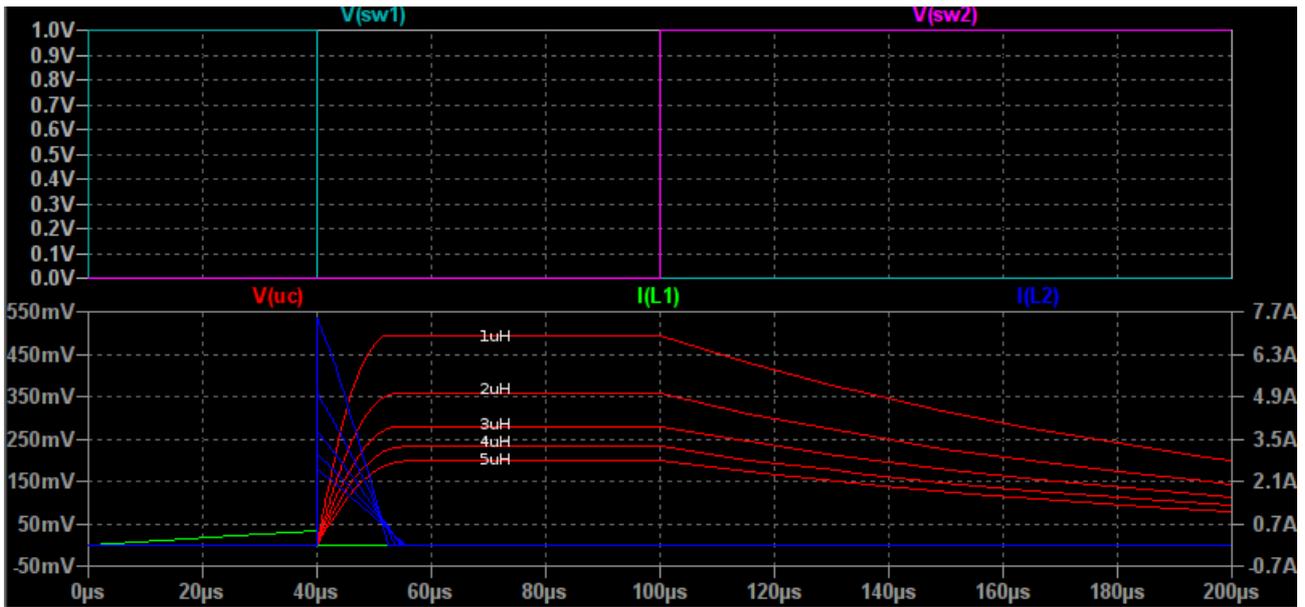
pic. Simulation result

Illustrates idea of using step-down flyback to produce very short high current pulses.

This formula can be used for currents and inductance in flyback

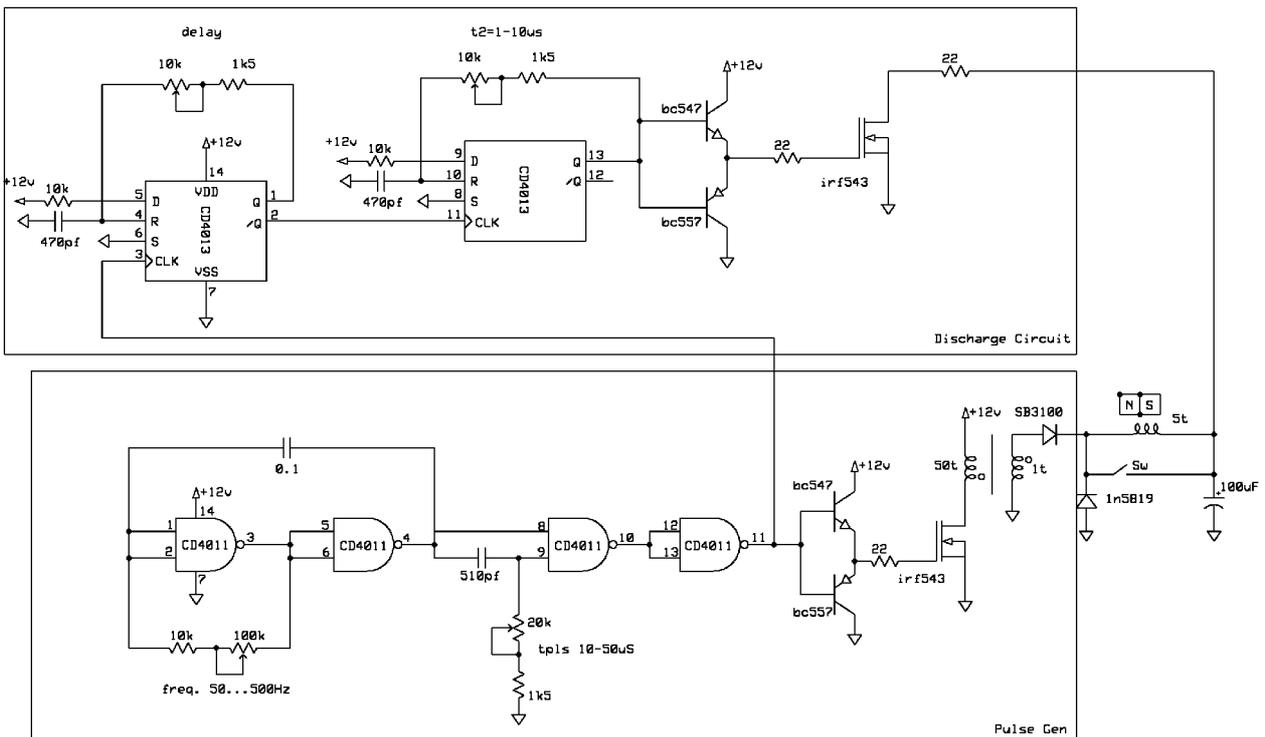
$$L_1 * I_{1max} = L_2 I_{2max}$$

therefore making $L_2 \ll L_1$ we can get $I_{2max} \gg I_{1max}$



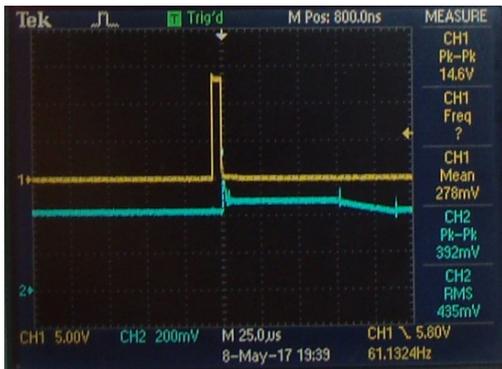
pic. Simulation results

Here extra coil (L3) value stepped from 1 to 5uH, it is clear visible that increasing inductance result in lower voltage on capacitor.



pic. Schematic of experimental setup (components and values can be slightly different)

Standard pulse generator with two channels can be used to control MOSFETs.



top(yellow) – driver pulse
 bottom(blue) – voltage on capacitor (capacitor not fully discharged with R1 S2)

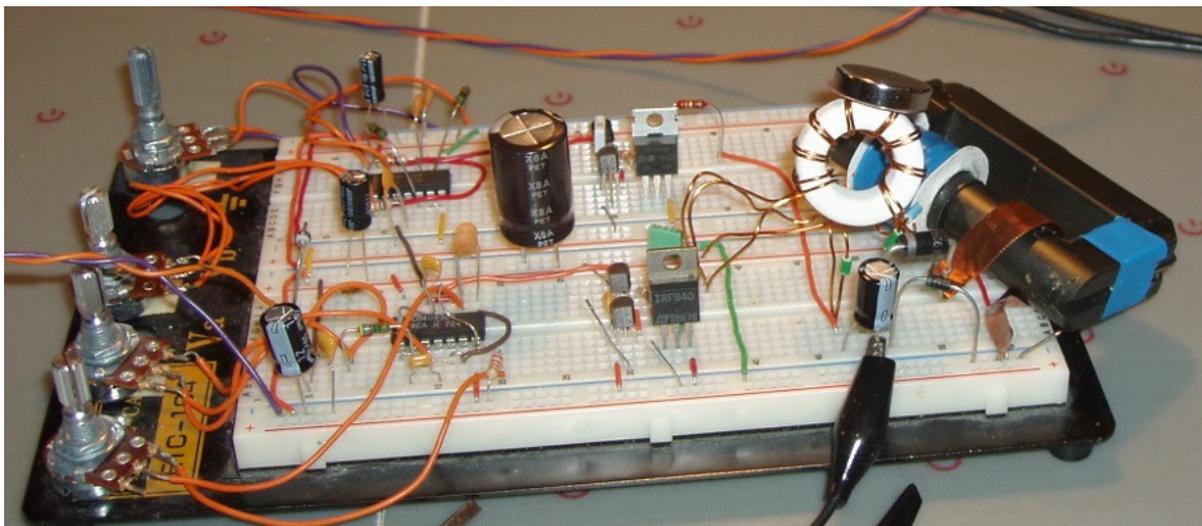


Voltage on capacitor with extra coil and magnet (only beginning of pulse shown)

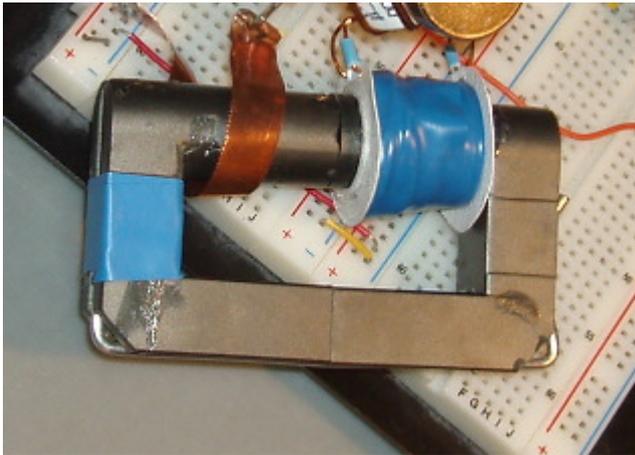


Without extra coil

Effect is small but clearly observable by shorting extra coil.
 Adding a “regular” coil decrease voltage on capacitor but adding a coil with ferrite core and magnet increase voltage on capacitor, therefore we can speak of negative resistance effect here.



pic. Experimental setup on bread board



Flyback step down transformer

Any ferrite core from old TV can be used

primary 20-50 turns

secondary 1 turn with copper foil



Extra coil

Ferrite ring core Ferroxcube
FE25-3F3 25,8/14/10,6mm

8 turns 2x0.7mm

20x5 NdFeb SuperMagnet

Thank you for reading :)