



Levitron – Perpetuator Business plan

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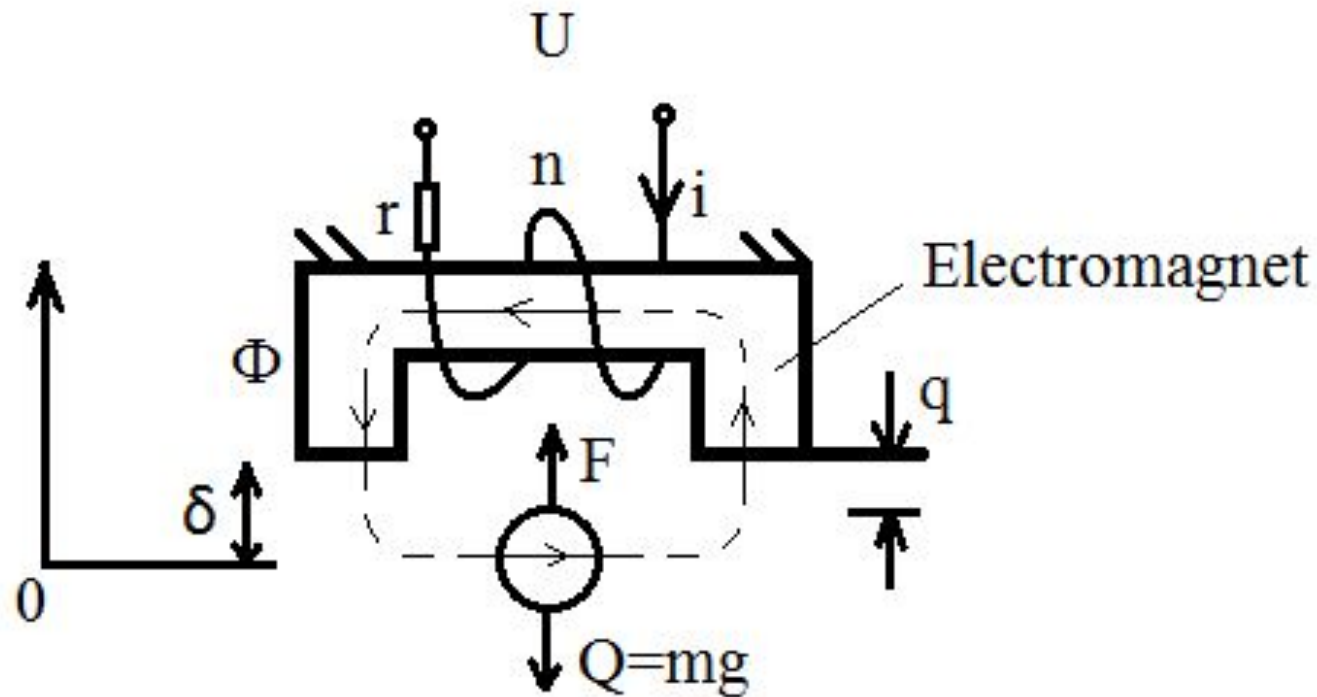
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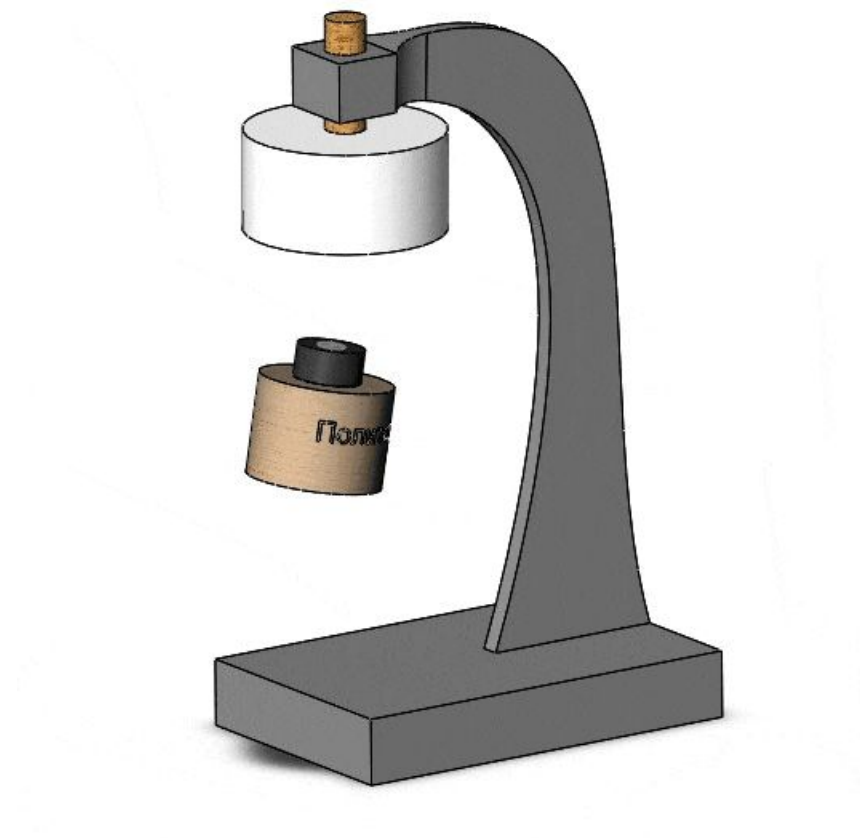
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General description of the idea



U-control voltage; **r**-resistance; **i**-current; **n**-number of rounds of a magnet coil; **Φ** -magnetic flux; **F**-magnetic force; **Q**-gravitational force ; **q**-the current value of the air gap between a body and poles; **δ** -necessary distance of a body from electromagnet poles; **m**-body weight; **g**-acceleration of gravity.

Graphic representation of a levitron

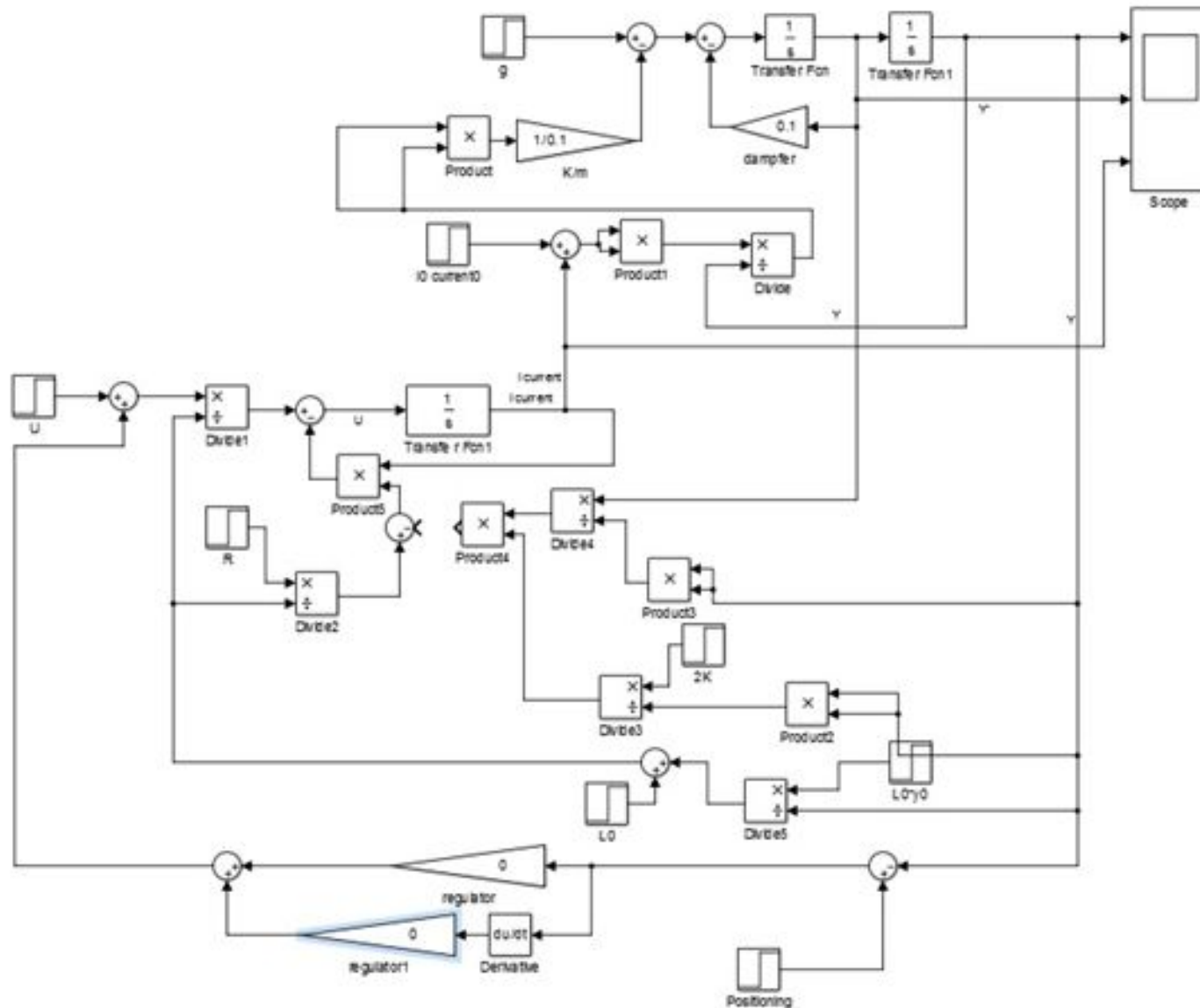


Mathematical description

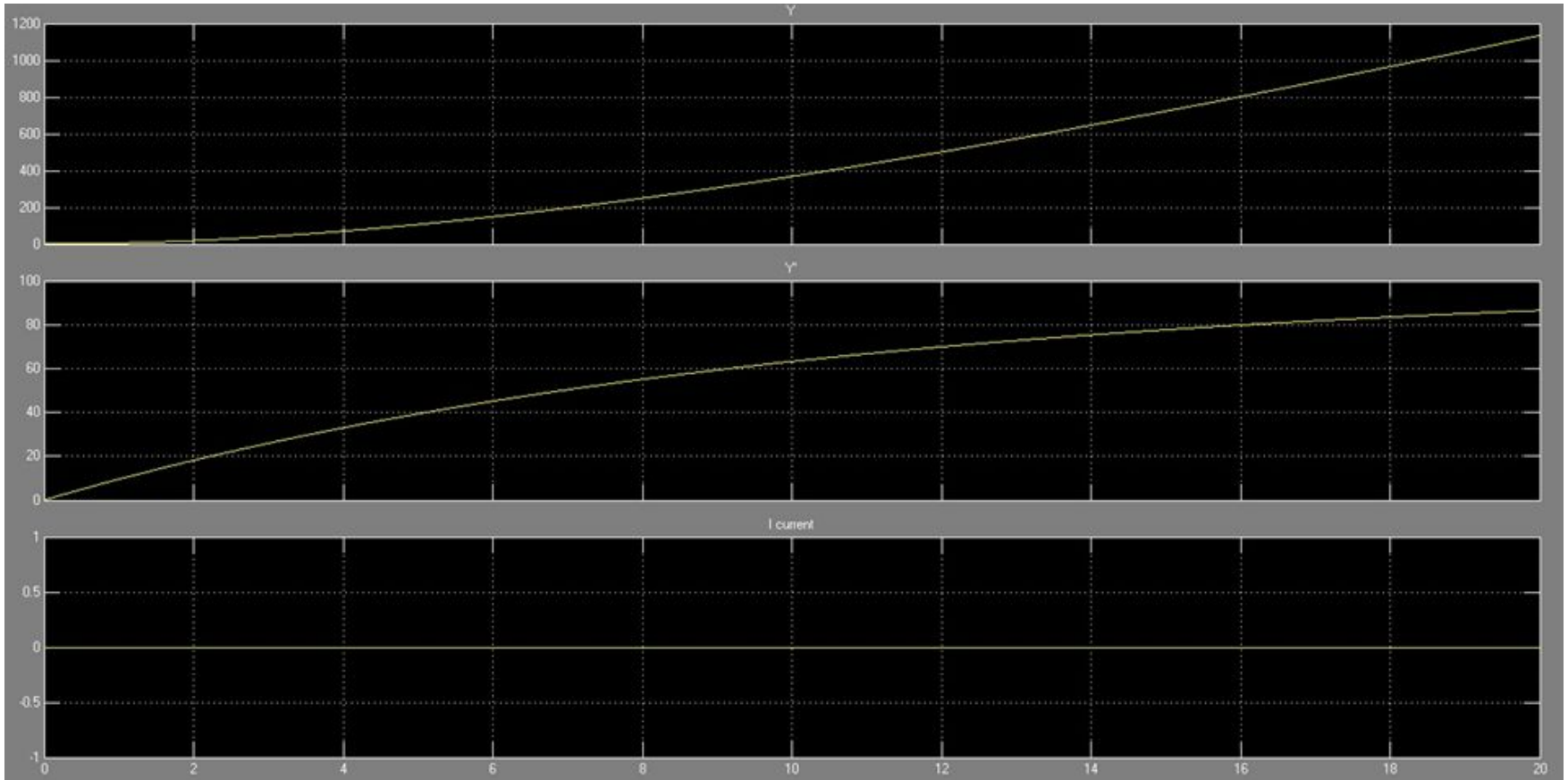
$$\begin{cases} \frac{dx_1}{dt} = x_2 \\ \frac{dx_2}{dt} = g - \frac{K}{m} \left(\frac{x_3}{x_1} \right)^2 \\ \frac{dx_3}{dt} = \frac{1}{L(y)} u - \left(\frac{R}{L(y)} - \frac{2K}{y^2} \frac{x_2}{x_1^2} \right) x_3 \end{cases} \quad ; \quad x_1 = y, \quad x_2 = \frac{dy}{dt}, \quad x_3 = i, \quad u = U_i$$

i – current in the coil, **R** – coil resistance, **L** – inductance,
y – distance between an object and an electromagnet,
K – electromagnetic constant, **v** – traveling speed of an
object, **m** – mass of an object.

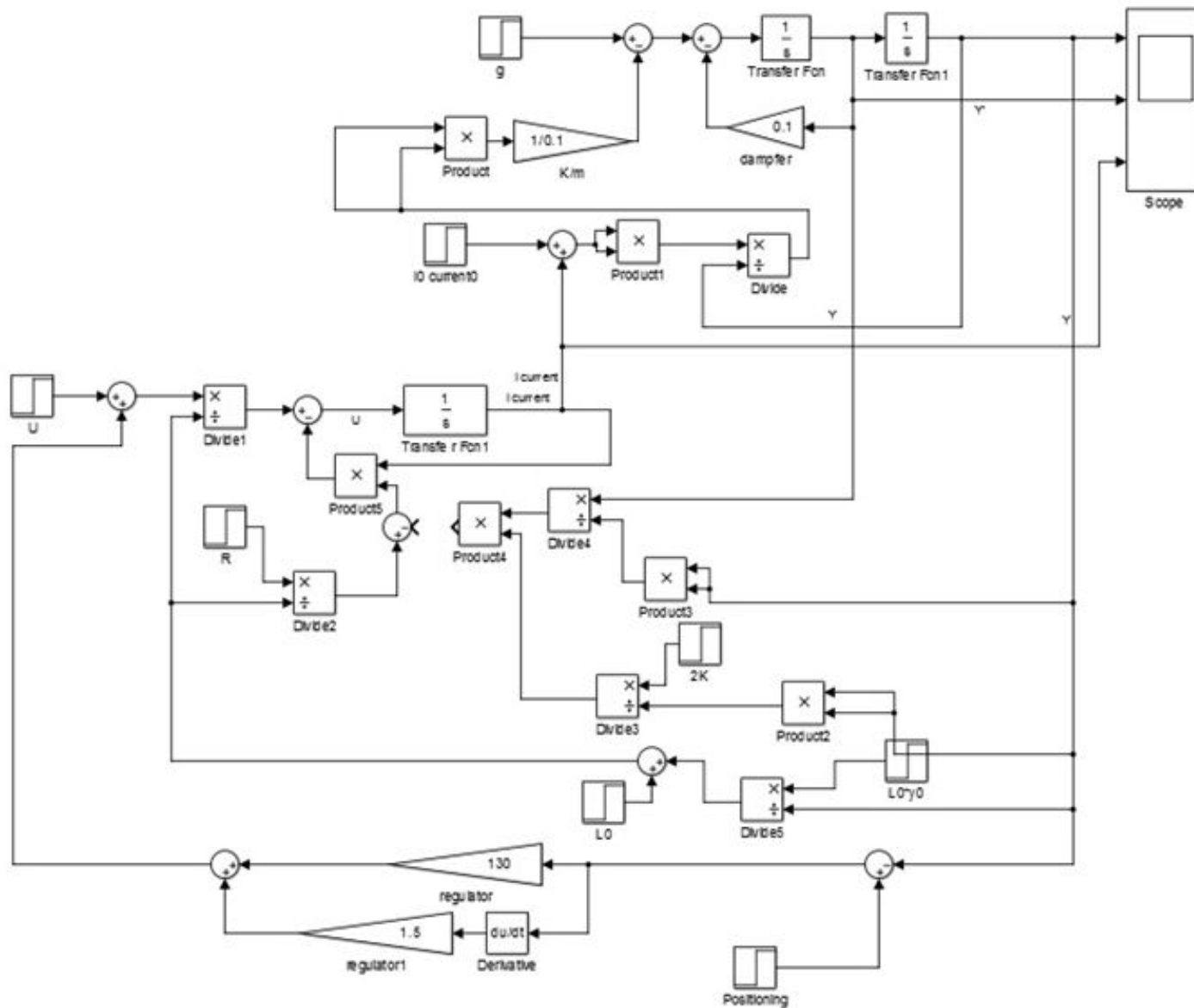
Mathematical justification (1)



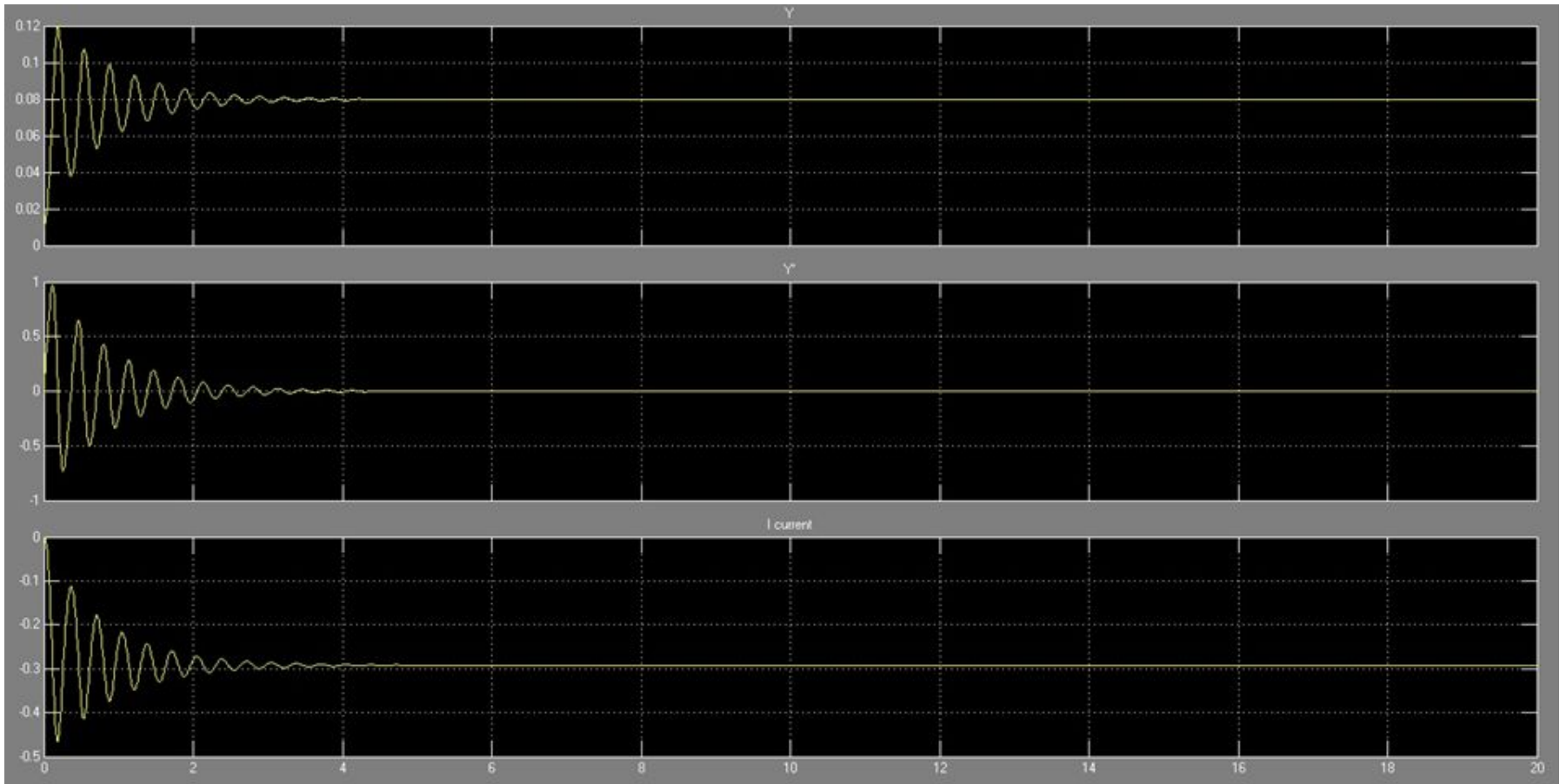
Mathematical justification (2)



Mathematical justification (3)



Mathematical justification (4)

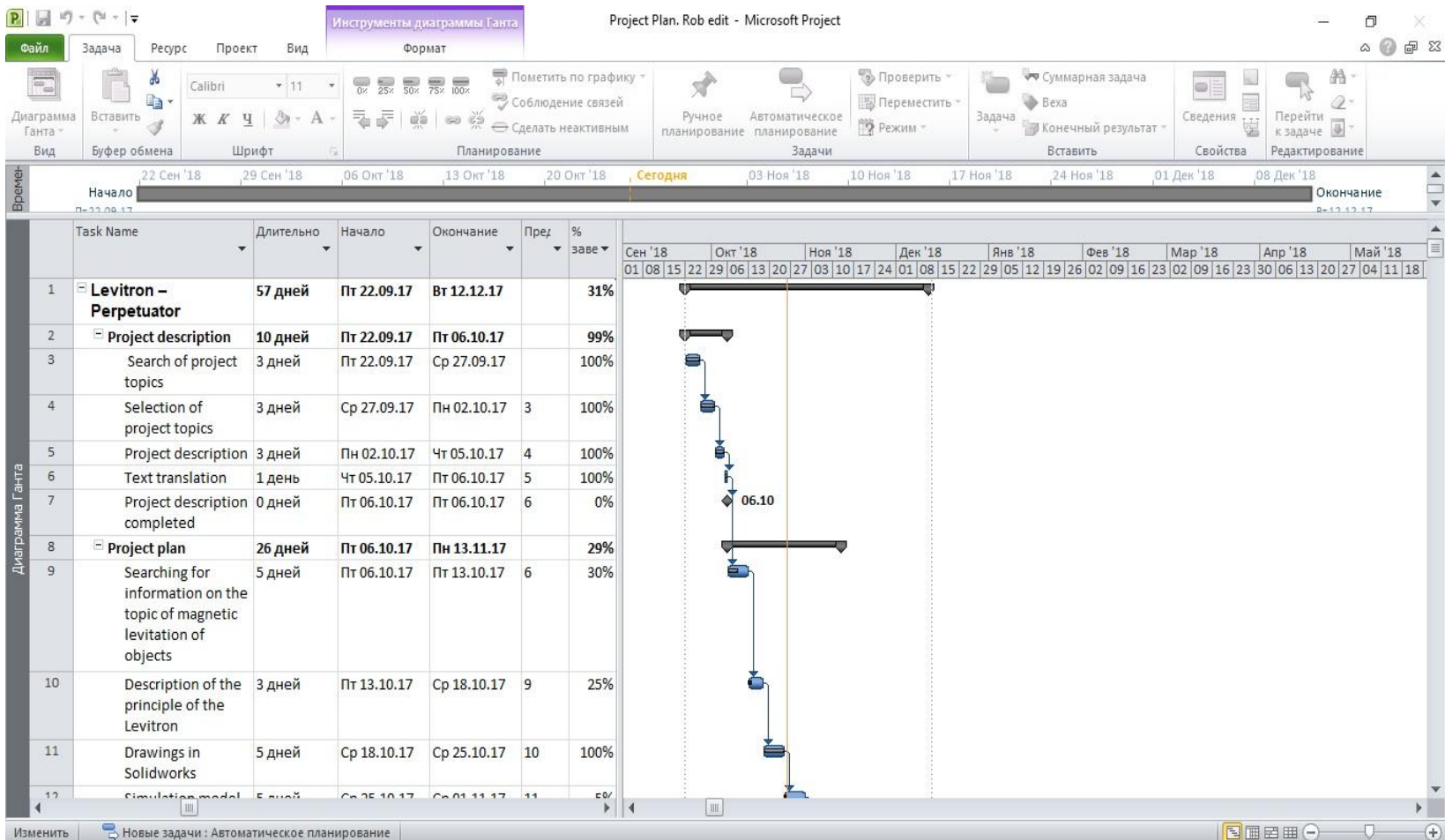


List of components and common budget of the project

Table 1. Elements of a levitron

Detail	Cost with delivery, rubles.
Copper pro-wolf of 80 meters	182,00
The linear sensor of Hall (UGN3503UA model) of 10 pieces	1 275,00
The steel core from a door loop with a diameter of 20 mm	110,00
Hot glue	598,00
Quadruple operational amplifier of LM324N	22,00
Resistors	15,00
Condenser	800,00
Small neodymium magnet * 2	100
Diode detector 1N4007 * 2	4,00
Arduino UNO microcontroller	520,00
Resistors 5,6 * 2	61,00
Field transistor	5,00
2 diodes of Shottki of 30 Amperes 45 Volts	110,00
L-63YT light-emitting diode yellow	20,00
L7805CV voltage regulator (5B, 1.5A)	10,00
Adapter of a delivery Ginzzu GA-1040U	1 110,00
Arm	180,00
Measuring glass	49,00
Basis	39,00
Total	5 110,00

Schedule of implementation of the project



Application and commercial justification





Thanks for an attention!!!