Gravity forces as a tool for the experimental verification of the universe simulators based on the measurement standards variability

Vitaly O. Groppen

Abstract - The main objectives of this paper are in experimental verification of the universe simulators based on the measurement standards variability by the gravity forces control technology and in optimization of parameters of deployed capacitors used in these experiments as sensors. Substrate material and capacity of these capacitors as well as applied voltage are the tools of this optimization. Used simulators result in mathematical model which is based on the idea of substitution of energy distributed in the neighborhood above the upper surface of the horizontally disposed deployed capacitor by the material point with equivalent mass: force of the gravitational interaction of capacitor with this point has opposite direction to the force of its' gravitational interaction with the Earth thus reducing this force. Results of experiments with different sensors and scales allow us to select effective equipment and combination of materials, construction, capacity and voltage, which should have a deployed capacitor in the further investigations.

Keywords - universe modeling, gravity control, experimental verification, high voltage, deployed capacitors, optimization, weight measurement.

I. Introduction

The first model of the gravitational interaction forces was proposed by Sir Isaac Newton in 1667 [1]. About 250 years later, in 1915, Albert Einstein demonstrated a new theory of gravitation based on the Theory of Relativity [2]. In 1929 an American astronomer Edwin Powell Hubble published his work “The relation between distance and radial velocity of galaxies” [3], which resulted in the ideas of the Universe expansion. All of the above works were based on the constancy of measurement standards, but in [4] proposed is an approach allowing different interpretation of the Hubble law, which is based on the idea of the measurement standards variability. Under this approach, we suppose that any measurement can be presented as consisting of two stages: during the first one we fix value of the measured parameter using auxiliary units, during the second stage we transform this data presenting them in corresponding conventional measurement standards. Thus result of measurement presented to the observer is the ratio with fixed value of the measured by auxiliary units object parameter in the numerator and measurement standard value in the same units in the denominator. For example, the stretched thread segment between two points "A" and "B" on a flat surface, fixes the shortest distance between these points, but it does not determine its' value.

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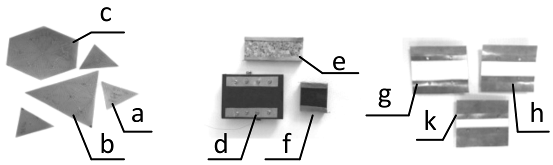
V. O. Groppen is with the North-Caucasian Institute of Mining and Metallurgy (State Technological University), Data Proc. Dept., Republic North Ossetia-Alania, Vladikavkaz, Nikolaev str. 44, Russia.
Phone: +79604025097; fax: +78672407203; e-mail: groppen@mail.ru.

Only by showing that this segment contains "n" times any linear measurement standard, it can be argued that the shortest distance between points "A" and "B" is known and it is equal to “n”. Similar is measurement of time by electronic stopwatch. Its display also reflects the ratio: in the numerator - the number of oscillator pulses issued since the start of measurement, in the denominator - the number of pulses generated within one second [4]. As a result, combining this approach and the Hubble Law succeeded to prove that the mass of any physical body exponentially decreases with time [4]. This mass loss gives rise to reactive force, but «spanning» any physical body in the isotropic medium into a single point it is easy to see that for any reaction force vector there is a similar force in value and opposite in direction, i.e. resultant of reaction forces in this case is equal to zero [5]. But any physical object mass loss in the anisotropic medium permits us to interpret gravitation as reaction forces unbalance thus giving chance for gravity control. As it is shown in [4] - [5], any two losing mass material points A and B located at R distance from each one create anisotropic medium round each of them resulting in reaction forces reflecting their coincidence with the Newton law of gravity. In 1921 Townsend Brown discovered movement of physical objects under the influence of high voltage [6], but this effect cannot be considered as control of gravitational forces because this phenomenon is known to be caused by ionization of air near acute and sharp edges. The experiments described below are a continuation of the experiments presented in [7] – [8]. Their objective is to refine the parameters of used samples that enhance the lifting force. They use high voltage and charged deployed capacitors for gravity control. These experiments are based on the model using substitution of the energy distributed in the neighborhood above the upper surface of the deployed capacitor by the material point with equivalent mass: force of the gravitational interaction of the plate with this point is directed opposite to the direction of the force of gravitational interaction of this plate with the Earth therefore reducing the capacitor’s weight (Fig. 2). As it is shown in [4, 5], such a weight reduction is proportional to the energy stored by a deployed capacitor. However, there are two opposite ways of increasing this energy. One of them is in increasing of capacitance of a deployed capacitor and, consequently, in reducing of distance between electrodes. To prevent the electric breakdown, the latter results in decreasing of voltage applied to a capacitor. Another way is to increase the voltage applied to the capacitor’s plates, which entails an increase in the distance between them and, as a consequence, reduction of capacitance of a capacitor. Below we analyze the efficiency of both approaches as well as optimization of construction of deployed capacitors.

II. Main Principles

Electrodes of used in experiments capacitors are designed as metal strips on a dielectric substrate forming thus deployed capacitor so that its' stored energy is distributed above the upper surface of a horizontally positioned capacitor (Fig. 1).



(a) (b) (c)

Fig 1. Deployed capacitors on fiberglass (a), granite (b) and ceramic (c) substrate used during the experiments (top view)

The energy E_i of each i-th charged capacitor is equal to:

$$\forall i : E_i = \frac{C_i U^2}{2}, \qquad (1)$$

where "C_i" is its' capacity, "U" - power supply voltage.

The mass of this energy is determined as follows:

$$\forall i : m(E_i) = \frac{C_i U^2}{2c^2}, \qquad (2)$$

where c - velocity of light.

Below we suppose that:

a) each capacitor is disposed horizontally, so that the electrodes are on its' upper surface;

b) distributed above the upper surface of this capacitor energy E_i is replaced by the equivalent body D, whose mass is determined by the expression (2).

Thus the force F_i of the gravitational interaction between the i-th capacitor and body D has a direction opposite to the force F_e of gravitational interaction between this plate and the Earth (Fig. 2).

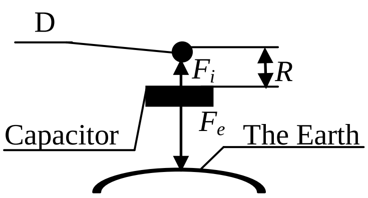


Fig.2. The forces of interaction of the body D, i-th capacitor and the Earth.

This lifting *i*-th capacitor force F_i value in accordance with the Newton Law of gravity and equation (2), for any sample at Fig. 1 is determined as follows:

$$\forall i : F_i = \gamma \frac{m_i C_i U^2}{2R^2 c^2}, \qquad (3)$$

where γ - gravitational constant, c - velocity of light, R - the shortest distance between the corresponding body D point and the surface of i-th capacitor.

Denoting F_e^0 the weight of a plate before experiment whereas F_e^1 - its weight during experiment when the electrodes on its surface are applied to voltage equal to U, it is easy to determine lifting force value:

$$F_i = F_e^0 - F_e^1. \qquad (4)$$

Fixing during each experiment all components of the equation (3) except distance R, the latter for i-th capacitor during j-th experiment can be determined as:

$$\forall i, R_i(U_j) = \frac{U_j}{c}\sqrt{\gamma \frac{m_i C_i}{2F_{i,j}}}, \qquad (5)$$

where $F_{i,j} = F_i$ during j-th experiment.

Thus value R_i for each i-th sample may be determined as the arithmetic average of $R_i(U_j)$:

$$\forall i : R_i = \frac{1}{j_{\max}} \sum_{j=1}^{j_{\max}} R_i(U_j). \qquad (6)$$

If we denote the subset of indices of capacitors having the same energy by the symbol "I", the best will be the k-th capacitor, which satisfies the following condition:

$$R_k = \min_{i \in I} R_i \qquad (7)$$

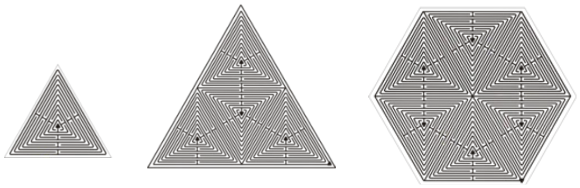
Since this distance, as it is shown below, is small, as the unit of its measurement below is used Fermi (Fm): 1 Fm = 10^{-15} m.

III. Equipment, Samples and Results of Experiments

As noted above, during the experiments were used three groups of samples: the first one was made in an effort to maximize the energy of charged capacitor via its' maximum capacity and simultaneously to minimize its' weight, whereas in the second and third groups for the same goal we tried to maximize the capacitor's weight and the voltage applied to the capacitor, which does not lead to the fixed leakage current. The latter restriction was necessary to minimize the lifting force of Biefeld-Brown effect [3].

A. The First Series of Experiments

Geometry of electrodes of the first group samples used in the first series of experiments is shown below in Figure 3, whereas their main parameters - in Table 1.



(a) (b) (c)

Fig. 3. Geometry of electrodes in the first group of capacitors

It is easy to see that "b" and "c" samples (Fig. 3) consist of four ("b") and six ("c") triangles type "a". On the lavsan layer of "a" sample (Fig. 3, a) were fixed 12 copper nested equilateral triangles creating two groups of copper electrodes with width of these electrodes equal to 1 mm. and distance between the neighbor electrodes equal to 1.213 mm (see Table 1). One group included six even triangles, another - six odd triangles and triangles in each group were connected electrically. During experiments center electrodes of all the "a"- triangles belonging to each "b" or "c" sample were connected electrically resulting in the parallel connection of corresponding capacitors.

Table 1. Parameters of deployed capacitors – samples used during the first series of experiments.

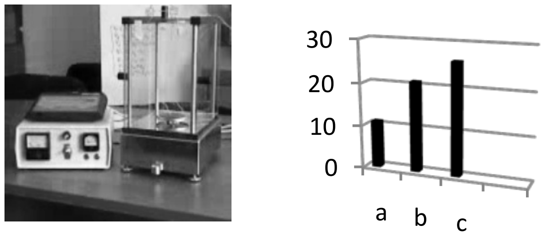
№	Parameter name	Labels of samples in Fig. 1			Sample presented in Fig.5a.	Units
		a	b	c		
1	2	3	4	5	6	7
1	The length of one side	0.098	0.194	0.098	0.07	m.
2	Weight	5.0 ± 2.2	19.7	33.23	10.6 ±0.02	g.
3	Thickness	0.6	0.6	0.6	3.5	mm.
4	Distance between the electrodes	1.213	1.213	1.213	1.45	mm.
5	Width of the electrodes	1.0	1.0	1.0	1.0	mm.
6	Capacity of the sample	33	121	174	35±5	pF
7	Material of the basis	Fiber glass with lavsan cover			Ceramic	-
8	Material of the electrodes	Copper			platinum	-

In the experiments we used:

a) the high voltage power supply IVNR-20/10, guarantying voltage range 1 – 20 kV, power 200 wt. (Fig. 4a,1);

b) precise electronic scale AV-60/01-S which precision is equal to 0.0001 g, maximum weight – 60 g., the settling time of weighting mode – about 10 minutes (Fig. 4a,2);

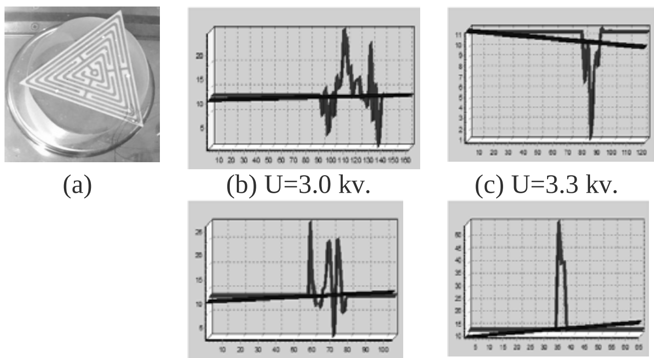
c) digital display of the electronic scale AV-60/01-S (Fig 4a, 3).



(a) (b)

Fig. 4. Equipment used in the first series of gravity control experiments (a) and corresponding diagram (b) of distances R_i ($i \in \{a, b, c\}$) values determined according to (6) for samples "a", "b", "c" (Table 1).

The experimental data reflecting dependences of lifting forces on voltage for each sample – capacitor are presented in Appendix 1 below. As shown in [4], any prolonged exposure of different samples based on fibre glass with lavsan cover to high voltage leads to its' electrical breakdown. In this connection were prepared the ceramic plates- deployed capacitors on an alumina base with platinum electrodes, the width of which was 1 mm, the distance between adjacent electrodes - 1.45 mm, the weight of each plate was 10,6 ± 0,2 gram. These plates were equilateral triangles, each side of which was equal to seventy millimeters, thickness - 3.5 mm, as the electrodes were used seven nested platinum triangles, and even triangles were connected electrically with each other, and the same for odd triangles. (Fig. 5). For commutation with the power supply for each electrode group was selected part of an electrode with silver coating.



(a) (b) U=3.0 kv. (c) U=3.3 kv.

(d) U=3.5 kv. (e) U=4.0 kv.

Fig. 5. Alumina based ceramic sample on the weight table (a), and its' weight change under different voltage (b – e).

It is easy to see that the hope for stability of weight readings during the experiments and high resistance to electrical breakdown of the samples of this kind is not justified. There seems to be three typical sources of weight value mistakes during the first series of experiments:

- due to the proximity of the electrodes in the samples of the first series of experiments for a voltage greater than 3.5 kV have been substantial leakage currents, indicating the impact of the Biefield - Brown effect on the weight of a sample.
- experiments for direct weight measurement of samples under high voltage resulted in direct interaction of electronic circuit of the scale and its sensor with the electric field of a sample often resulting in distortions in indications of weight by the scale and even in blocking the electronics of the scale;
- any prolonged exposure of comparative high voltage exceeding 3.5 – 4.0 kV to any sample in the first series of experiments leads to its' electrical breakdown.

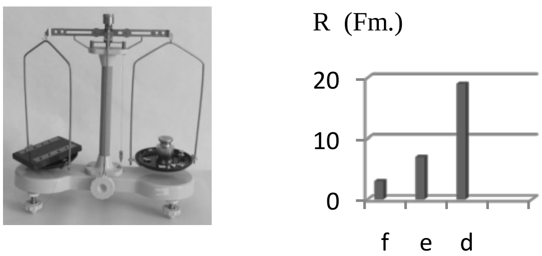
To minimize the errors indicated above, during the second series of experiments were used the other samples and equipment.

B. *The Second Series of Experiments*

Within the second series of experiments we used:

- new samples with better resistance to electrical breakdown made of granite with two spaced apart parallel copper strips, attached to the top of each granite rectangle (Fig. 1b);
- instead of precise electronic scale AV-60/01-S new precision mechanical balance AB-200 with maximum weight equal to 200 gram and precision equal to 0.001 g (Fig. 6a), which is not exposed to electromagnetic radiation.

The weight, capacity and geometrical parameters of the samples "d", "e" and "f" shown at Fig. 1b are presented below in Table 2.



(a) (b)

Fig. 6. Mechanical scale AB-200 (a) and corresponding diagram (b) of distances R_i ($i \in$ {d, e, f}) values determined according to (6) for samples "d", "e", "f" (see Table 2).

Voltage and corresponding change of weight for each sample of the second group are presented in the Appendix 2, whereas diagram of distances R_i (i = d, e, f) values determined according to (6) for samples "d", "e", "f" (Table 2) is presented at Fig. 6b. Samples of the diagram depicted in Figure 6b are ordered by increasing of their capacity.

Table 2. Parameters of samples used during the second series of experiments.

№	Parameter name	Labels of samples in Fig. 3a			Units
		d	e	f	
1	2	3	4	5	6
1	Upper surface area	0.0063	0.003072	0.0016	m^2
2	Total surface area	0.01586	0.008704	0.0048	m^2
3	Weight	211.0	85.16	55.07	g
4	Thickness	10.0	10.0	10.0	mm
5	Distance between the electrodes	30.0	22.0	26.0	mm
6	Width of the electrodes	11.0	5.0	7.0	mm
7	Capacity	6.166	2.9	1.6	pF
8	Material of the plate basis	Granite			-

C. *The Third Series of Experiments*

Within the third series of experiments was used the same equipment as in the previous series, but construction of samples (see Fig. 1c) was different:

- width of cooper strips was increased;
- all deployed capacitors had different minimal distances between the cooper strips (Fig. 1c, Fig. 7);
- we could change the angle $\beta = 180^{o} - 2\alpha$ between the electrodes in the range $0 \div 180^{o}$ (Fig. 7).

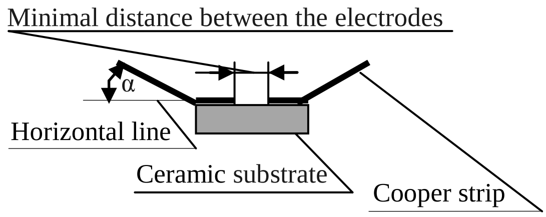


Fig 7. Construction of deployed capacitors on ceramic substrate used during the third series of experiments (butt view).

The aim of this series of experiments was in optimization of deployed capacitors construction, i.e. in determination of optimal angle α value maximizing lifting force F_l for each sample within each voltage level.

Voltage, angle α values and corresponding lifting forces for the sample "h" used in the third series of experiments (Fig. 1c) with capacity C = 3.9 pF and weight P = 78.2 g. are presented in the Appendix 3, whereas set of diagrams of distances R_h values determined according to (5) for this sample as voltage U and angle α functions is presented at Fig. 8 below. It is easy to see that for "h" sample:

- α angle optimal value depends on value U: in the range U = 10 ÷ 14 kV $\alpha_{opt} = 0^o$, for $15 \le U \le 18$ (kV), $\alpha_{opt} = 15^o$, whereas for the range 19÷20 (kV), $\alpha_{opt} = 30^0$;
- dependence α_{opt} (U) is close to the linear one in the range $10 \le U \le 20$ (kV) (Fig. 9):

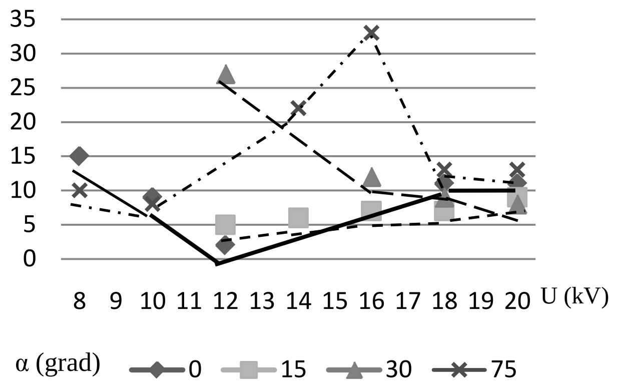


Fig. 8. Distances R_h values as functions on voltage U and on angle α.

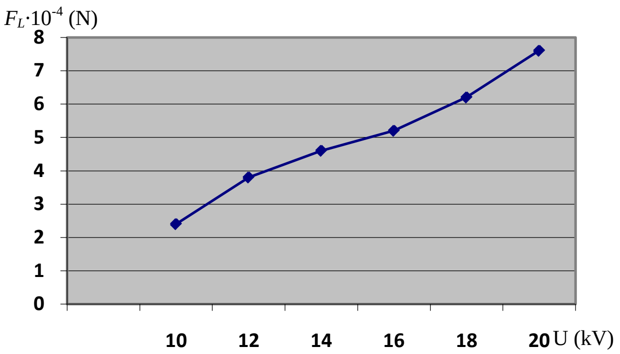


Fig. 9. Lifting force F_L on voltage U dependence if $\alpha = \alpha_{opt}$.

IV. CONCLUSIONS

Using (6) and (7) and comparing the diagrams 4b and 6b for the cases, where the energies gained in different capacitors are close, it is easy to see the benefits of the second approach: in the energy range $2 \cdot 10^{-4} < E < 8 \cdot 10^{-4}$ (j) the following inequality holds:

$$\min_{i \in I_2} R_i \le \min_{j \in I_1} R_j, \qquad (8)$$

where I_1 – the set of samples used in the first series of experiments; I_2 – the set of samples used during the second series of experiments.

In other words, the above experimental results allow us the following conclusions:

1. Results of experiments in the first approximation confirm the validity of the universe simulators, based on the measurement standards variability.
2. It is preferred to use in experiments the precise mechanical scales, whose readings are independent of the electromagnetic fields.
3. The range of the voltage applied during the experiments to the sensors should be expanded.
4. To exclude the influence on the readings of the scales of the charged particles movement in the air (Biefeld-Brown effect, [9]), the experiments should be repeated in an airless environment. In this case, of course, measures should be taken against the occurrence of field emission and spark discharge in vacuum.

APPENDIX 1

Table 3. Voltage and corresponding lifting forces F_i, $i \in \{a, b, c\}$, for the samples "a", "b" and "c" used during the first series of experiments (see Fig. 1a)

#	U (V)	F_a (N)	F_b (N)	F_c (N)
1	2	3	4	5
1	2000	$7.845 \cdot 10^{-6}$	$25.497 \cdot 10^{-6}$	$11.767 \cdot 10^{-6}$
2	2500	$15.69 \cdot 10^{-6}$	$10.787 \cdot 10^{-6}$	$20.593 \cdot 10^{-6}$
3	3000	$6.374 \cdot 10^{-6}$	$13.729 \cdot 10^{-6}$	$28.439 \cdot 10^{-6}$
4	3500	$3.922 \cdot 10^{-6}$	$73.549 \cdot 10^{-6}$	$32.361 \cdot 10^{-6}$

APPENDIX 2

Voltage and corresponding lifting forces F_i, $i \in \{d, e, f\}$, for the samples "d", "e" and "f" used during the second series of experiments (see Fig. 1b) are presented in Table 4 and Table 5 below:

Table 4. Voltage and corresponding lifting forces F_d and F_e for the samples "d" and "e" (see Fig. 1b)

#	U (V)	F_d (N)	F_e (N)
1	2	3	4
1	9000	-	$1.412158 \cdot 10^{-4}$
2	10000	-	$1.90249 \cdot 10^{-4}$
3	11000	-	$2.755669 \cdot 10^{-4}$
4	12000	-	$2.843929 \cdot 10^{-4}$
5	13000	$1.833844 \cdot 10^{-4}$	$3.6873 \cdot 10^{-4}$
6	14000	$2.265336 \cdot 10^{-4}$	$5.138685 \cdot 10^{-4}$
7	14500	$2.628182 \cdot 10^{-4}$	-
8	15000	$2.598762 \cdot 10^{-4}$	$5.295592 \cdot 10^{-4}$
9	15500	$3.138128 \cdot 10^{-4}$	-
10	16000	$3.854014 \cdot 10^{-4}$	$7.404021 \cdot 10^{-4}$
11	17000	-	$7.58054 \cdot 10^{-4}$
12	18000	-	$8.482752 \cdot 10^{-4}$
13	19000	-	$10.86577 \cdot 10^{-4}$
14	20000	-	$11.33649 \cdot 10^{-4}$

Table 5.Voltage and corresponding change of lifting force F_f for the sample "f" (see Fig. 1b,f)

#	U (V)	F_f (N)
1	2	3
1	2500	$1.137571 \cdot 10^{-4}$
2	3000	$1.274865 \cdot 10^{-4}$
3	4000	$2.186883 \cdot 10^{-4}$
4	5000	$1.549451 \cdot 10^{-4}$
5	7500	$2.43205 \cdot 10^{-4}$
6	10000	$1.78481 \cdot 10^{-4}$
7	14000	$2.16727 \cdot 10^{-4}$
8	15000	$0.8825985 \cdot 10^{-4}$

APPENDIX 3

Voltage, angle α values and corresponding lifting forces for the sample "h" (Fig. 1c) with capacity C = 3.9 pF and weight P = 78.2 g. are presented in Tables 6-9 below:

Table 6. Sample "h", angle α = 0º.

#	U (V)	α (º)	F_h (N)
1	2	3	4
1	8000	0	$3.136 \cdot 10^{-5}$
2	10000	0	$1.2936 \cdot 10^{-4}$
3	12000	0	$2.4892 \cdot 10^{-4}$
4	18000	0	$3.1654 \cdot 10^{-4}$
5	20000	0	$3.8612 \cdot 10^{-4}$

Table 7. Sample "h", angle α = 15º.

#	U (V)	α (º)	F_h (N)
1	2	3	4
1	12000	15	$5.4488 \cdot 10^{-4}$
2	14000	15	$7.2324 \cdot 10^{-4}$
3	16000	15	$6.73358 \cdot 10^{-4}$
4	18000	15	$6.91978 \cdot 10^{-4}$
5	20000	15	$5.14598 \cdot 10^{-4}$

Table 8. Sample "h", angle α = 30º.

#	U (V)	α (º)	F_h (N)
1	2	3	4
1	12000	30	$2.156 \cdot 10^{-5}$
2	16000	30	$1.8914 \cdot 10^{-4}$
3	18000	30	$4.4688 \cdot 10^{-4}$
4	20000	30	$7.0364 \cdot 10^{-4}$

Table 9. Sample "h", angle α = 75º.

#	U (V)	α (º)	F_h (N)
1	2	3	4
1	8000	75	$7.546 \cdot 10^{-5}$
2	10000	75	$1.499 \cdot 10^{-4}$
3	14000	75	$4.41 \cdot 10^{-4}$
4	16000	75	$2.64 \cdot 10^{-4}$
5	18000	75	$1.979 \cdot 10^{-4}$

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Vitaly Groppen was born in 1945, he graduated from the North-Caucasian Institute of Mining and Metallurgy, Russia in 1967. In the 1960s he worked as an Assistant Professor at the Department of Industrial Electronics in the North-Caucasian Institute of Mining and Metallurgy, Vladikavkaz, North Ossetia, Russia. In 1973 he graduated from postgraduate courses in the Institute of Control Science of Russian Academy of Sciences (Moscow, 1970 – 1973) and worked as the Head of Computing Centre of North-Caucasian Institute of Mining and Metallurgy (1973 – 1980) and as an assistant (1973 – 1976) and as Docent (1976 -1988) at the Department of Mathematics in the same institution. In the 1980s he continued as Senior Specialist of the Data Processing Department in the Dresden Technical University (German Democratic Republic, Dresden, 1980), and in the Leipzig Technical Higher School (German Democratic Republic, Leipzig, 1985). Since 1987 until 1989 he is Professor and Head of the Department of Mathematics in the North-Caucasian Institute of Mining and Metallurgy, North Ossetia, Russia, but from 1989 until now – founder and head of the Automated Data Processing Department in the same Institution. In the 1990s he was a visiting Lecturer in the Catalonia Technical University (Barcelona, Spain, 1990) and in the LG Research Centre (Seoul, Republic Korea, 1995). Since 1999 he is member of European Mathematical Society and since 2008 he is the Director of the Research Institute of Applied and Theoretical Informatics (Vladikavkaz, North Ossetia, Russia). His research interests are focused on mathematical modeling, astronomy, physics, optimization theory and its' applications, graphs theory, discrete programming, theory of games, taxonomy, solutions making theory, computer aided images processing, optimal program codes design. He is the author of more than 130 papers, 5 patents and 7 monographs.