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CAPACITOR ENGINE FOR AN AIRCRAFT

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A capacitor engine for an aircraft

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BACKGROUND OF THE INVENTION

There is a well known Biefield-Brown Effect [6], lying in the fact that a capacitor situated under direct high voltage has a tendency to move towards the positive pole. - see fig 1, depicting the change of the capacitors weight depending on the polarity of the applied voltage. There are aircrafts designed on the base of this effect. The principal layout of their construction is shown on Fig. 2, where

1 – the aircraft high-voltage source of direct voltage,

2 – plane capacitors.

The direction of aircraft's movement is controlled by activating a certain capacitor and by polarity of applied voltage.

In [1, 7] contains a detailed description and analysis of this effect, and also numerous references on this subject. Several known hypotheses of the nature of his effect are being considered and analyzed. It is shown that all these hypotheses for certain reasons are not sufficient for the explanation of this effect. Moreover, all these hypotheses are using new, unconventional concepts of physical phenomena. In [6] there are references on Braun's patents; also the known theories of this effect are regarded and their inconsistency is proved. In [2] another theory of this effect is presented.

In [3, 5, 8, 9, 10] the experiments demonstrating this effect are described. In [1, 4, 6, 7] the data is cited indicating that research work on this effect had been performed , and they possibly could have resulted in making functioning aircrafts.

The shortcomings of these prototypes are as follows:

1. All parameters of the aircraft are chosen experimentally (as a theory that should have served as a base for constructive calculations, is absent)
2. Carrying and motive powers are limited.
3. Theoretic substantiation of the functioning lying in the framework of existing physical paradigm, is absent.

The last shortcoming leads to the absence of a method for constructive calculations of the aircraft, which hampers its industrial realization.

SUMMARY OF THE INVENTION

In the present claim the described effect is explained theoretically within the existing physical paradigm. Based on the presented theory a method for the capacitors calculation is suggested. This method permits to design such a capacitor which would generate power far exceeding the power generated by ordinary capacitor.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention may best be understood by referring to the following description and accompanying drawings which illustrate the invention. In the drawings:

Fig. 1. Change of capacitor's weight depending on the polarity of the voltage applied to it.

Fig. 2. The principal layout of the aircraft.

Fig. 3. The metallic coating of the capacitor, built of squares.

Fig. 4. The metallic coating of the capacitor, built of polygons.

Fig. 5. Capacitor.

Fig. 6. To theoretical basis.

The invention is illustrated by Figures 2, 3, 4, showing

1- high voltage source of electric potential
2 – capacitors,
3 – metal capacitor coatings, and
3a – thin metal capacitor coating,
3b – thick metal capacitor coating,
4 – slits in the metal capacitor coating,
5 - dielectric plate.

Fig. 2 shows the principal layout of the aircraft design. The output of high-voltage electric potential source 1 is loaded on the capacitors 2.

Fig. 3 shows the metallic coating 3 of capacitor 2. This coating 3a has numerous slits 4. These slits are situated in such a way that the metallic coating has acquired a regular structure consisting of multiple squares, and the slits isolate the sides of squares one from the other. The width of the slits is significantly smaller than their length.

Fig. 4 shows metallic coating 3a of the capacitor 2, which (differing from Fig. 3) has a regular structure consisting of multiple polygons (in our case – hexagons). These metallic polygons are connected by their vertexes, and the slits isolate the sides of adjacent polygons one from the other.

Fig. 5 shows condenser 2. Between a thin metal plate 3a with slots 4 and thick metal plate made from porous metal 3b there is a dielectric board 5, made of a material with high permittivity.

The principle used in the presented invention consists in the fact that the power developed by one capacitor with a certain area S, is much less than the summary power of multiple capacitors with summary S. The substantiation of this assumption will be given in Section 1.4.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS

In order to better understand the invention, a theoretical description is presented first. This is followed theoretical description and description of the preferred embodiment will address the following matters:

1. Theoretical Description

1.1. About the density of the plate's charge

Here we present the explanation of the nature of the forces that move the capacitor, and the method for these forces calculation.

The intensity of a field created by infinite flat spatially charged layer, is equal to [16]

$$E = \frac{a\rho}{2\varepsilon}, \tag{1}$$

where a is the layer thickness, ρ - spatial charge density.

For $a \to 0$ the flat spatially charged layer turns into an infinitely thin plane with surface charge density

$$\sigma = a\rho. \tag{2}$$

Let us consider the distribution function of charge density on a square plate surface. This function may be approximately described by formula [17]

$$\sigma(z, y) = \frac{Q}{2\pi^2 \sqrt{(b^2 - z^2)\cdot(b^2 - y^2)}}, \tag{3}$$

where

b – half of the plate's sides,

Q – full charge of the plate,

z, y – current coordinates.

The function (3) may be approximated by function

$$\sigma(y, z) = \sigma_o \mathrm{Ch}(\beta z)\mathrm{Ch}(\beta y), \tag{4}$$

To calculate the parameter β we shall consider a function (following from(3))

$$R(z) = \frac{1}{b\sqrt{(b^2 - z^2)}}. \tag{5}$$

For $z = z_1$ we have $R_1 = R(z_1) = \dfrac{1}{b\sqrt{(b^2 - z_1^2)}}$, and for $z = 0$ we have $R_o = R(0) = 1/b^2$.

Let us assume that the points $z = z_1$ and $z = 0$ belong to a hyperbolic cosine

$$R_o \mathrm{Ch}(\beta z). \qquad (6)$$

Then $R_1 = R_o \mathrm{Ch}(\beta z_1)$, from which we find

$$\beta = \frac{1}{z_1} \mathrm{aCh}\left(\frac{R(z_1)}{R_0}\right). \qquad (7)$$

The point z_1 must be chosen close to the edge of the square. Fig. 6 shows the function (5) for various values of b (dot line) and the approximating function (6) (solid line). Here the coefficient β was calculated according to (7) for $z_1 = 0.95b$. We have $\beta = 10 \cdot [1.93, 2.57, 3.86, 7.71]$ for $b = 0.1 * [1,\ 0.75,\ 0.5,\ 025]$.

If the capacitor is charged by charge Q, then

$$Q = \iint_S (\sigma(y, z)) dzdy, \qquad (8)$$

where the double integral is taken over a surface

$$S = 4b^2 \qquad (9)$$

of a square plate. It may be shown that

$$Q_1 = \iint_S \mathrm{Ch}(\beta z)\mathrm{Ch}(\beta y) dzdy \qquad (10)$$

has the value

$$Q_1 = \left(\frac{2\mathrm{Sh}(\beta b)}{\beta}\right)^2. \qquad (11)$$

Thus,

$$Q = \sigma_o Q_1 \qquad (12)$$

and

$$\sigma_o = Q / Q_1. \qquad (13)$$

Let us also consider the coordinate axis ox, directed perpendicularly to the plate surface and originating from its center. If the spatially charged layer of a flat plate has the thickness $a \to 0$, we may assume that its spatial charge σ turns according to (2) into a surface charge

$$\rho = \sigma \cdot \gamma'(x), \qquad (14)$$

where $\gamma'(x)$ – <u>non-dimensional</u> Dirac function. Then formula (4) turns into formula for surface charge

$$\rho(x, y, z) = \sigma_o \mathrm{Ch}(\beta z)\mathrm{Ch}(\beta y)\lambda'(x). \qquad (15)$$

Thus, if the charged layer of the plate is very thin $a \to 0$, then the density distribution of a surface charge is described by formula (15); if the charged layer thickness is $a >> 0$, then the density distribution of its spatial charge is described by formula (4).

The thickness of negatively charged layer $a \to 0$ due to the smallness of electron size. The thickness of positively charged layer $a >> 0$ due to the fact that a positively charged ion is thousands times larger than an electron. So, the densities of negatively or positively charged plate are described by (15) or (4) accordingly.

1.2. The structure of capacitors electric field

Let us consider a flat capacitor with square plates.

In it the positive and negative charges have equal (by absolute value) distribution functions of cubic density (1.4), therefore their total intensities will be equal (by absolute value), and their sum will be equal to zero. But the negative charges (unlike the positive ones) will have also distribution function of surface density (1.15), and intensities created by these charges will not be compensated by the respective positive charges.

Let us now find the intensities created by the charges (1.15). In [12] a method of calculation is presented for an electromagnetic field created by charges distributed by Dirac function. In [15] it is proved by this method that magnetic charges (which may be represented by face planes of permanent magnets), distributed according to (1.15), generate a harmonic static magnetic field – a wave-like variation of this field intensity.

Let us remark that the history of the search for longitudinal waves is thoroughly examined in [13]. We must note also that the existence of longitudinal magnetic waves has been confirmed by experiments [14], in which the so called "magnetic walls" were stated. In [18] some experiments are described showing experimentally that an harmonic static magnetic field really exists.

Quite similarly [15] it may be shown, that electric charges (1.15) create an intensity of electric field with the following projections on the coordinate axes:

$$E_x(x,y,z) = e_x \mathrm{Ch}(\beta z)\mathrm{Ch}(\beta y)(\lambda(x) - \cos(\chi x)), \tag{1}$$

$$E_y(x,y,z) = e_y \mathrm{Ch}(\beta z)\mathrm{Sh}(\beta y)\sin(\chi x), \tag{2}$$

$$E_z(x,y,z) = e_z \mathrm{Sh}(\beta z)\mathrm{Ch}(\beta y)\sin(\chi x), \tag{3}$$

where

$$e_x = -\frac{\sigma_o}{\varepsilon}, \tag{4}$$

$$e_y = -e_x/\sqrt{2}, \tag{5}$$

$$e_z = -e_x/\sqrt{2}, \tag{6}$$

$$\chi = \beta\sqrt{2}. \tag{7}$$

So we must conclude that in this case a so called harmonic electric static field is created.

1.3. The forces working on the capacitor plates

The negative charges (1.15) of a negatively charged plate create on the level of positively charged plate the intensities (2.1) or

$$E_{x4}(L,y,z)=\frac{\sigma_o}{\varepsilon}\mathrm{Ch}(\beta z)\mathrm{Ch}(\beta y)(\lambda(L)-\cos(\chi L)), \qquad (1)$$

where L – the thickness of insulator between capacitor plates - see (2.1).

Intensity (1) works on the charges of positively charged plate with the force

$$F=\iint_S (E_{x4}(L,y,z))\sigma(y,z)dydz. \qquad (2)$$

Substituting (1, 1.4) into (2), we find:

$$F=\sigma_o^2[1-\cos(\chi L)]F_1/\varepsilon, \qquad (3)$$

where

$$F_1=\iint_S \begin{pmatrix}\mathrm{Ch}(\beta z)\mathrm{Ch}(\beta y)\cdot \\ (\sigma_o\mathrm{Ch}(\beta z)\mathrm{Ch}(\beta y))dydz\end{pmatrix}. \qquad (4)$$

We may show that this integral is equal to

$$F_1=\left(\frac{\mathrm{Sh}(2\beta b)}{2\beta}\right)^2. \qquad (5)$$

From (3, 1.13,) it follows

$$F=Q^2[1-\cos(\chi L)]F_1/(Q_1^2\varepsilon). \qquad (6)$$

Note, that the capacity of our capacitor is

$$C=\frac{4b^2\varepsilon}{L}. \qquad (7)$$

If the voltage U have been fed to the capacitor, then its charge is

$$Q=U\cdot C \qquad (8)$$

or

$$Q=4b^2U\varepsilon/L. \qquad (9)$$

Combining (6, 9), we find

$$F=16\frac{F_1}{Q_1^2}b^4U^2\varepsilon\zeta(L), \qquad (10)$$

where

$$\zeta(L)=(1-\cos(\beta L\sqrt{2}))/L^2. \qquad (11)$$

For $L\to 0$ (which is valid practically for all flat capacitors)

$$\zeta(L)\approx\beta^2. \qquad (12)$$

From (10, 11) we get:

$$F = 16\frac{F_1}{Q_1^2} b^4 U^2 \beta^2 \varepsilon \, , \tag{13}$$

1.4. Calculating the forces working on the capacitor

From (3.13) it follows

$$F = F_3 U^2 \varepsilon \, , \tag{1}$$

where

$$F_3 = 16 b^4 \beta^2 F_1 / Q_1^2 \, . \tag{2}$$

Let us remind that the values F_1, Q_1 are determined by (3.5, 1.11) accordingly. We may show that the function

$$F_3(b) = \text{const} \, . \tag{3}$$

i.e. F_3 does not depend on b. For example, for $z_1 = b \cdot \lfloor 0.9,\ 0.95,\ 0.98 \rfloor$ (see Section 1.1) $F_3 \approx \lfloor 8,\ 15,\ 31 \rfloor$. Therefore, N paralleled capacitors develop force

$$F = N F_3 U^2 \varepsilon \, , \tag{4}$$

independent from b. The total area of these capacitors is

$$S = 4Nb^2 \, . \tag{5}$$

Thus, if N are situated on area S (as shown on Fig. 3), then

$$F = \frac{S F_3}{4b^2} U^2 \varepsilon \, . \tag{6}$$

For instance, for $F_3 \approx 16$ and $b = 0.1\text{m}$ we have:

$$F \approx 400 S U^2 \varepsilon \, . \tag{7}$$

It is known that $\varepsilon = \varepsilon_m \varepsilon_o$, where $\varepsilon_o = 8.85 \cdot 10^{-12}$ - absolute permittivity of dielectric vacuum. From (7) it follows:

$$F = 3 \cdot 10^{-9} S U^2 \varepsilon_m \, , \tag{8}$$

Where the area is measured in square meters, and the force – in newtons. In Section 1.3 the examples of force (8) calculation are cited.

2. Description of preffered embodiment

A capacitor engine for an aircraft comprising several flat capacitors 2 which are connected to on-board high-voltage source 1. Each capacitors 2 contains one metal plate 3b is made of relative thick porous metal, and one metal plate 3a is made of relativethin metal. Both plates 3 have the form of number of solid squares or solid polygons. These squares or polygons connected by their vertices to each other. The distances between the sides of the adjacent squares or polygons (width slits 4) are substantially less than the dimensions of the sides of the squares or polygons. Between said two plates 3 is situated a dielectric board 5 having a high permittivity.

The aircraft functions as follows. Controlled high voltage U_k (from high voltage source 1) is applied to each capacitor 2 - C_k. Vector force F_k developed by each capacitor C_k is proportional to squared voltage U_k^2, i.e., $\overline{F_k} \equiv \overline{i_k} U_k^2$, where $\overline{i_k}$ – a unit vector perpendicular to the plane of capacitor C_k. Summary force working on the aircraft is $F = \sum_k \overline{F_k}$. By varying the voltages U_k we may be able to direct the aircraft in any direction.

The explanation of the nature of forces moving the capacitor 2 (as also the calculation method for these forces) is based on the fact that, as will be shown in Section 1.4, <u>a harmonic static electric field</u> appears in the capacitor's dielectric 5 – a wave-like change of the field's intensity. This field is created due to non-uniform distribution of the surface density of electric charges on the capacitor plates 3. The wave length depends on the capacitor plates configuration.

The wave amplitude depends on the size of charges on the capacitor plates 3. More precisely, the amplitude is the larger, the smaller is the charges sizes. Since the electron charges are much smaller than ion charges (the size of positive ion is thousand times larger than the size of electron), the negatively charged capacitor plates 3a creates a "higher" wave than the positively charged capacitor plate 3b.

In addition, the amplitude of this wave depends on the thickness of the metal plates 3 of the capacitor 2. More accurately, the amplitude is the greater, the thinner is the metal plate. A thin metal plate 3a creates a "higher" wave than a thick metal plate 3b. Also it is important that in the thick metal plate the charges must be distributed throughout the metal thickness, and not be concentrated in the surface layer. For this aim the thick metal plate 3b is made from a porous metal.

In the capacitor the positive and negative charges have equal (in absolute value) summary values. However, the distribution functions of the charges densities are different for metal plates of different thickness. Therefore the intensities created by such charges on such plates are not compensated. More accurately, the intensity created by the charges of a thin plate 3a on the level of the thick plate 3b is much higher than the intensity created by the charges of the thick plate 3b on the level of the charges of the thin plate 3a. This difference of intensities is exactly the force that is acting on the capacitor.

The explanation of the difference between distribution functions of the charges densities throughout solid and porous plates is as follows. In a solid plate the charges are concentrated on the plate's perimeter, and the density function has maximum on the perimeter and minimum in the center of the plate. In a porous plate the charges are distributed on the surface of the pores. In average the density function is constant throughout all the volume of a porous plate.

In Section 1.4 it is shown that force, acting on the capacitor 2, is determined from the formula

$$F = \vartheta S U^2 \varepsilon_m, \tag{1}$$

where

ε_m is relative permittivity of dielectric 5 in the capacitor 2,

S - the capacitor 2 area,

θ - a coefficient significantly depending on the capacitor plates 3 configuration; in the presented construction $\theta \approx 10^{-9} \div 10^{-8}$.

The thickness of dielectric 5 is determined according to the value of breakdown voltage for the given material.

The possibility of unsupported movement is explained by the fact that the capacitor's charges interact with the electric field of the capacitor. The charge and the field created by it are autonomous and independent objects (and not one object), as it was shown as early as by Faraday.

Concerning the value of ε_m, nowadays there are dielectrics with very high permittivity, for instance, ceramics CCTO and a newly synthesized material [9] with permittivity of 10^5 (and for certain conditions even higher, 10^6).

Example 1. For dielectric acrylic resin for $\varepsilon_m = 3.5$, $S = 1\text{м}^2$, $\theta \approx 3 \cdot 10^{-9}$ according to (1) we have: $F = 10^{-8} U^2$ (newton). In particular, $F = 1\text{н/м}^2$ for U=10 000в, $F = 100\text{н/м}^2$ for U=100 000в.

Example 2. For ceramic dielectric $\varepsilon_m = 35000$, $S = 1\text{м}^2$, $\theta \approx 3 \cdot 10^{-9}$ we have: $F = 10^{-4} U^2$ (newton). In particular, $F = 1\text{н/м}^2$ for U=100в, $F = 100\text{н/м}^2$ for U=1000в.

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Claims

A capacitor engine for an aircraft comprising flat capacitors connected to on-board high-voltage source, characterized in that, in order to increase the lifting and driving force, in each capacitor, the first metal plate is made of relative thick porous metal, and the second metal plate is made of relative thin metal in the form of number of solid squares or solid polygons, connected by their vertices to each other, and the distances between the sides of the adjacent squares or polygons are substantially less than the dimensions of the sides of the squares or polygons, and between said two plates is situated a dielectric board having a high permittivity.

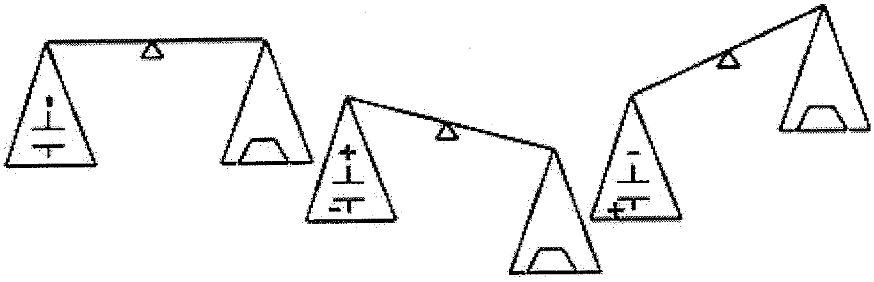


Fig. 1.

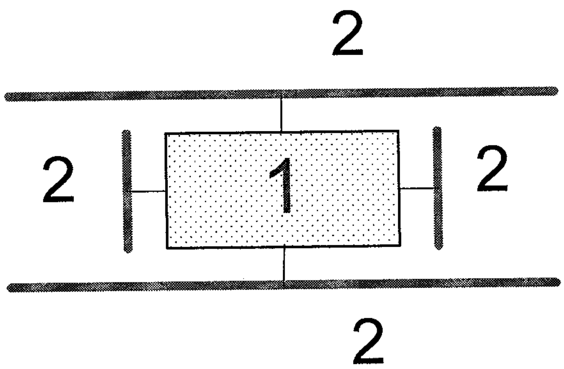


Fig. 2.

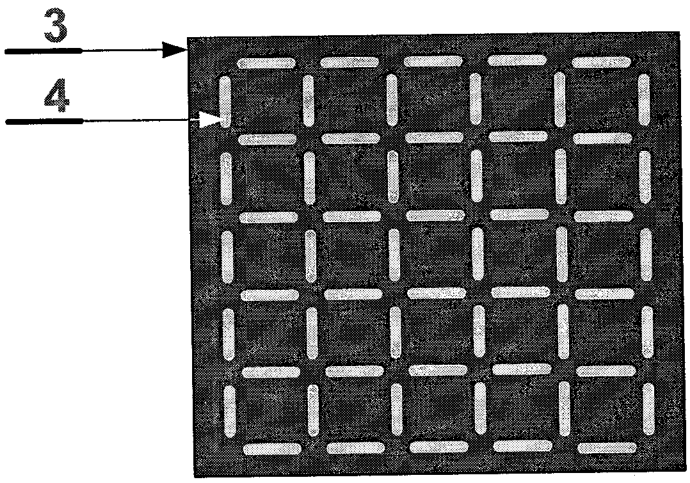


Fig. 3.

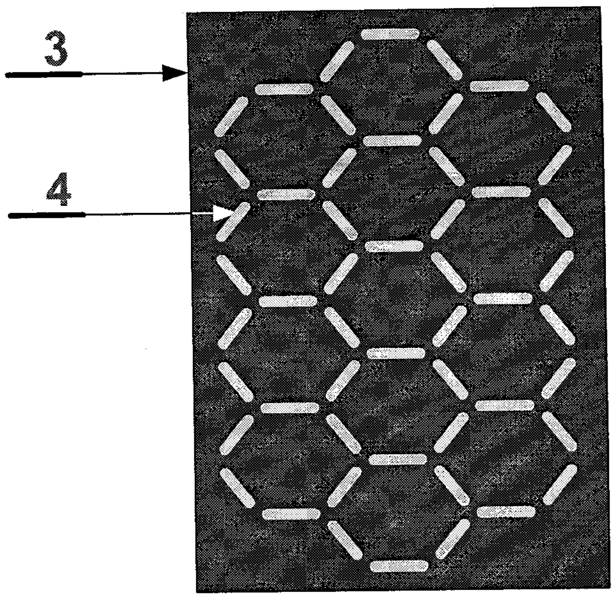


Fig. 4.

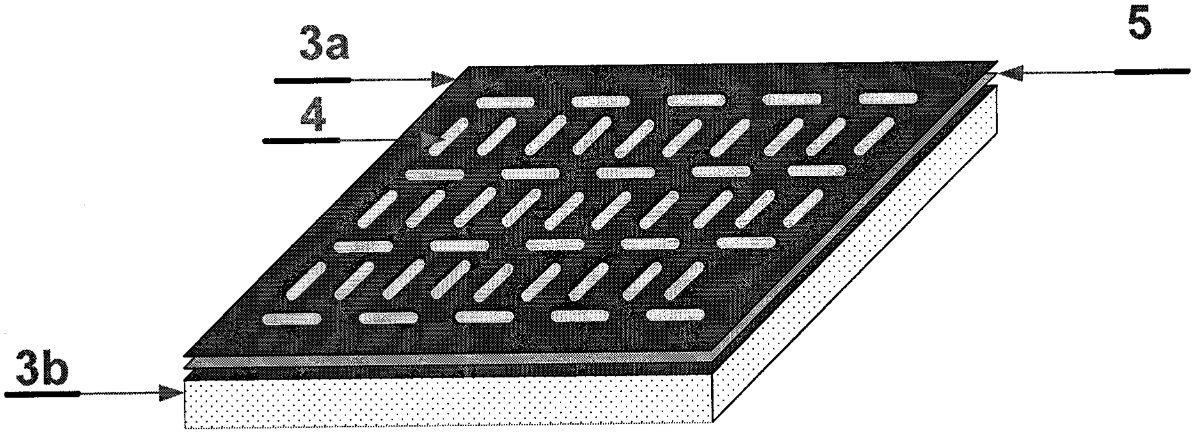
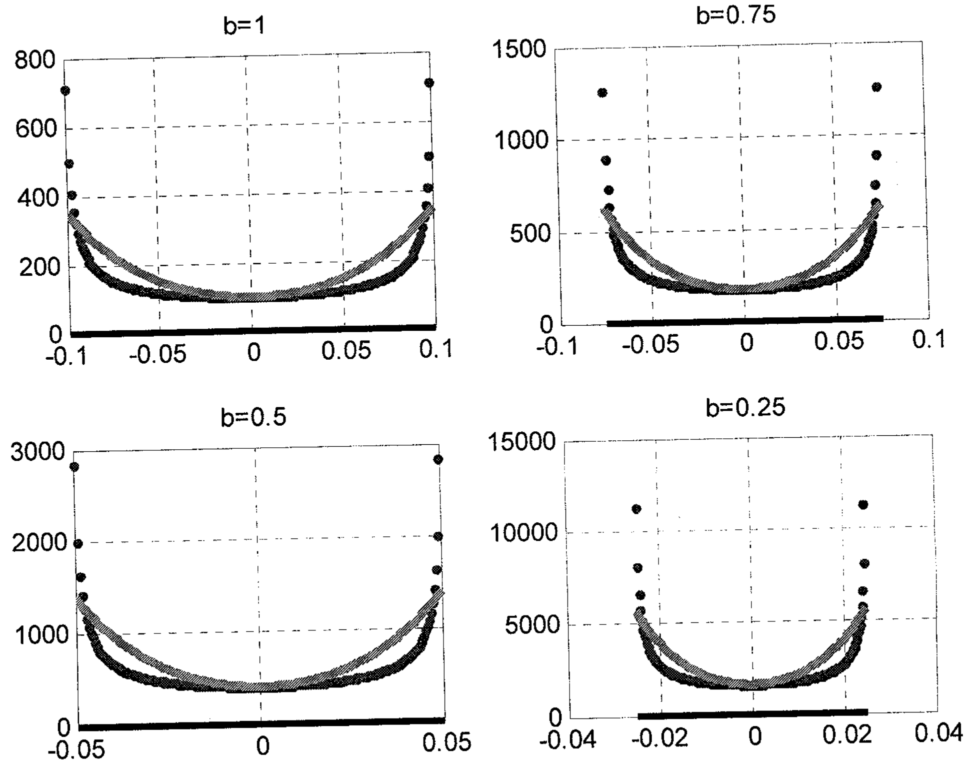


Fig. 5.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-0.1
-0.05
0
0.05
0.1
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2000
1000
0
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0.05
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15000
10000
5000
0
-0.04
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0
0.02
0.04

Fig. 6.