

THE PATTERNS OF "CROP CIRCLES" ARE CREATING BY MICRO PHYSICAL PHENOMENA

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Introduction

Liquids and gas transports in the porous stratified rocks may be interesting in connection with the problems of the underground fluid dynamics and gas dynamics, arising in:

in the technologies of the sequestration of the carbon dioxide (CO₂) in the underground porous geological stratum (1, 4, 6);

in the destructive outburst of coal and gas in mines (2);

in leakage and disastrous ejection of the carbon dioxide (CO₂) from terrestrial depths to atmosphere (2, 3);

in the process of formation on the land of the patterns, named as "Crop Circles" (5, 7).

The actual problems of the liquids and gas transports includes the study micro and macro mechanisms of the gas transports in such of the porous stratified rocks as the chalk, limestone, sandstone, coal, argillaceous rock.

The porous stratified rocks is representing the three-phase (solid, fluid and gaseous) system with the parameters portioned in the space.

The Investigation of the mechanism of gas transport in such system is connected with problems of the arduous approachability for direct study in terrestrial depth of the physics-chemical micro processes in stratified rock as well as with difficulties of the determination and descriptions of the distribution in the space of the parameters, which is characterizing the micro structure of the rock.

The certain help in the investigations of the micro and macro mechanisms of the gas transports in the porous stratified rocks may render the fenomenological theories and the model theories. The Difference between them has not of the precise boundaries.

In the fenomenological theory the porous stratified rocks consider in the manner of continuum (8, 9), which the characteristics is describing by the system, which is containing of the averaging equations and the effective coefficients.

In the model approach (10,11) the distribution in the space of the micro parameters of the porous stratified rocks describes by the model micro structure of the porous stratified rocks.

Often the porous stratified rocks consider in the manner of ensemble of the micro particles (solid, fluid and gaseous), which interacts one with another.

Depending on taken into account processes and characteristics of the concrete porous system, in the model approach, is determining the system of the physics-chemical and geometric features, which describes properties of the micro particles of each of phases.

Investigates of the expansion of the micro process from one micro particle towards another .

The value of the potential of the depression wave, arising in the initial micro cavity, depends on value of the characteristic time (the micro time interval) the quick-acting micro destruction (micro cracking) in the environment and depends on value of the micro size of the micro destruction in the environment, which occurs during the characteristic time.

The Environment

In some articles (2, 5, 7) the phenomenological approach is used for the description of the mechanism, which creates the patterns ("Crop Circles") which consist of the herbs. The herbs grow on the meadow, under which underground environment is formed (**Fig.1.**) by the porous stratified rocks (the chalk, limestone and others).

The Volume of the liquids in monolith, consisting of the porous stratified rocks, comparatively is small. In layer (**Fig.2.**) of the environment the solid micro particles and the fluid micro particles (the films of the capillary-disengaged water) are portioned such that between them are situated filled by gas the micro cavities.

The gas (the gas micro particles), filling the micro cavity which situates in the layer of the environment, is insulated by the solid micro particles and by the fluid micro particles against the gas, filling the nearby micro cavities of the environment.

The fluid micro particle (**Fig.2., Fig.7.**), touching with solid micro particles of wall of the micro passage from one micro cavity to other micro cavity, overlays this micro passage.

The value of areas of surfaces of the partition the gas - a liquid for some fluid micro particles, overlaying micro passages between micro cavities, situated in neighboring layers, exceeds, per order and more, the values of areas of surfaces of the partition the gas - a liquid, characterizing other fluid micro particles (situated in one layer of environment) (**Fig.1.**).

In environment the quick-acting micro destruction (micro cracking) of the solid micro skeleton, consisting of the solid micro particles, creates the quick-rising cavity of the micro crack (**Fig.3.**). The conditions in that cavity is approximately the same as vacuum.

Quick arising the conditions, close to vacuum, quickly creates the shock of the pressure in the first fluid micro particle, which overlays micro passage from filled by gas the initial micro cavity to the micro crack.

Quick arising the shock of the pressure in fluid micro particle destroys (overpunches) the fluid micro particle.

The overpunch of first fluid micro particle opens micro passage for moving the gas from the initial micro cavity in the cavity of the micro crack.

From the initial micro cavity in the cavity of the micro crack (**Fig.4.**) be spreading of the shock wave and the subsequent gas micro stream (12).

The depression wave be spreading of to opposite side from the initial micro cavity (**Fig.4.**). This depression wave be running on one of two undisturbed fluid micro particle of the initial micro cavity.

The depression wave, which be running on the fluid micro particle, has quantitative characteristics including the value (the potential) N and the value ζ .

Value (the potential) N corresponds of the total potential possibility of the depression wave, which run against the fluid micro particle, to create the process of the series overpunch, by the depression wave (5, 7), of the fluid micro particles in the amount $(N - N_h^*)$.

The Potential of the depression wave in the initial micro cavity it is N_{zm} .

The depression wave, potential which does not exceed the critical value (N_h^*) , unapt to overpunch the fluid micro particles, on which the depression wave runs up (5).

The value of the potential of the depression wave, arising in the initial micro cavity, depends on value of the characteristic time (the micro time interval) the quick-acting micro destruction (micro cracking) in the environment and depends on value of the micro size of the micro destruction in the environment, which occurs during the characteristic time.

The Value (ζ) represents the measure of the velocity of the spreading of the overpunch of the fluid micro particles.

The Value (ζ) is defined by relation of the value of the potential of the depression wave, running on micro particle, unto the quantity of the fluid micro particles, which, subsequent to the overpunch of this

micro particle, will be overpunching, during micro interval of the characteristic time, the quick-acting micro destruction (micro cracking) in the environment.

The Value (ζ) stays constant for any the fluid micro particle, which will be destroyed by the overpunch, during spreading of the the overpunch in the environment.

The Value (ζ) depends on value of the characteristic time (the micro time interval) the quick-acting micro destruction (micro cracking) in the environment and depends on value of the micro size of the micro destruction in the environment, which occurs during the characteristic time.

The depression wave, value of the potential for which does not exceed the values ($2 \cdot N_h^*$), will be capable to overpunch at the micro cavity not more then one fluid micro particle, by which this micro cavity segregates from other micro cavity (5).

Hereinafter will be supposed, that value of the potential N_{zm} of the depression wave in the initial micro cavity will be not exceeding value ($2 \cdot N_h^*$).

At such value of the potential of the depression wave at the initial micro cavity, running on the surface of the second fluid micro particle, which overlays the micro passage from the initial micro cavity in the second micro cavity, causes the instant overpunch of the second fluid micro particle (**Fig.5.**) and not be overpunching the third fluid micro cavity in the micro cavity.

The overpunch of the second fluid micro particle opens the micro passage for moving (the shock wave and the subsequent gas micro stream) of the gas from the second micro cavity into the initial micro cavity.

Hereon, in the second micro cavity, into opposite side from the initial micro cavity, will spread of the depression wave. This depression wave runs against on one of two the fluid micro particles, which was not overpunched, and destroy (overpunch) one of this two the fluid micro particles.

By such a image the overpunch of the following fluid micro particles, overlaying the micro passage between the micro cavities (**Fig.6.**), will spread in the volume of the porous stratified rocks, and by such a image the accompanying phenomenas (moving the gas from the micro cavities, the micro stream of the atmospheric air) will spread in the volume of the porous stratified rocks.

The destruction (overpunch) of the fluid micro particle by the depression wave decreases the potential of the following depression wave on the one in contrast with potential of the previous depression wave.

The groups of the micro cavities, connected by the open (overpunch) micro passages, creates the micro canals permeable for air.

On the surface of the land in the place of the output the micro canal, permeable for air, arises the orifice, through which by the micro canals to the rising cavity of the micro crack instantaneously dashes micro streams of the atmospheric air.

By great number of such orifices on surface of the land creates the contour.

Instantaneously the pressure of the air in the micro streams greatly are decreased against the atmospheric pressure.

Herewith, instantaneously appears the essential difference between pressure of air in micro streams and between pressure of water solutions inwardly the fabrics of the stalks of the plants, rising on surface of the land.

The Pressure, in the water solutions within the stalks of the plants, whose nodes were bypassed by the micro streams of air, must fall instantaneously.

The instantaneous falling of the pressure in the water solutions within the stalks of the plants creates the cavitation processes, which are softening the fabrics and enlarges their volume and are punching the shells of the plants.

The hard micro particles from wall of micro canal wrest by the stream of the atmospheric air, which are spreading with high velocity on the airpermeable of network of the micro canals.

The air micro streams, directionals from the atmosphere in the depth of the land, creates the bend towards the land stalks of the plants on field along of this contour.

The bended stalks of the plants be shaping the patterns, famous as "Crop Circles".

The easy observed, the air whirlwind, be producing in the atmosphere, as result of the great number, directed towards the surfaces of the land, of the air micro streams.

In the environment (the porous stratified rocks), the quick-acting micro destruction (micro cracking) begins the mechanisms of the simultaneous processes, including:

the spreading in volume of the environment of the overpunch of the fluid micro particles (**Fig.4, Fig.5, Fig.6.**) and the forming the micro canals;

the displacement in the space of the gaseous, solid and fluid micro particles (**Fig.8.**);

the change of the electromagnetic margins in the environment and in the atmosphere.

Besides of the quick-acting micro destruction (micro cracking) in the environment, exists the external sources (the natural and artificial), which also can start the mechanisms of the displacement in the space of the gaseous, solid and fluid micro particles and be causes of the change of the electromagnetic margins in the environment and in the atmosphere.

The mechanisms of the simultaneous processes, starting by the quick-acting micro destruction (micro cracking) in the porous stratified rocks, can interact with the similar mechanism, that creates by the another natural or artificial source.

Interacting one with another, the mentioned mechanisms can repeatedly increase.

The results of such interaction can be observed, for instance, in the manner of the luminous objects in the atmosphere.

The depression wave, arising in the micro cavity, be spreading regardless of displacement in the space of the solid and fluid micro particles, insulating the micro cavity from the nearby micro cavities.

Therefore when moving in the space of the solid and fluid micro particles, insulating the micro cavity, the depression wave can run against the fluid micro particles (**Fig.10.**) and destroy (overpunch) the fluid micro particles another than in the event of motionless (**Fig.9.**) in the space of the solid and fluid micro particles.

In the event of the moving of the solid and fluid micro particles in the space will be destroyed (overpunch) fluid micro particles (**Fig.10.**), which was be undisturbed (**Fig.9.**) in the event of the motionless solid and fluid micro particles in the space.

Accordingly, the outlines of the micro canal in the event of displacement in the space of the solid and fluid micro particles differ from the outlines of the micro canal in the event of the motionless in the space of the solid and fluid micro particles.

The change of the electromagnetic margins, caused by the quick-acting micro destruction (micro cracking) in the environment and by the external sources, acts upon the dissociated and ionized gas, which are moving between the shock wave and the depression wave.

The influence of the electromagnetic margins upon the dissociated and ionized gas causes the change of the direction of the spreading the depression wave in the micro cavity.

Therefore, at the change of the electromagnetic margins in the environment, the depression wave can run against the fluid micro particle and destroy (overpunch) the fluid micro particle, another than in the absence of such changing.

One of the observed phenomenas, caused by the displacement of the micro particles and by the change of the electromagnetic margins and by the spreading of the depression waves in the micro cavities, are presented by a patterns from the bented stalks of the plants, arising on the surface of the land.

Other observed phenomena, caused by the displacement of the micro particles and by the change of the electromagnetic margins and by the spreading of the depression waves in the micro cavities, are presented by an instant outbursts of the coal and the gas in mines (2).

At the fenomenological approach, the influence of the mechanisms of the simultaneous processes in the environment, caused by the mechanisms of the simultaneous processes, starting by the quick-acting micro destruction (micro cracking) in the porous stratified rocks, are taken into the account in the value of the effective coefficients (5,7).

At the model approach, the influence of the mechanisms of the simultaneous processes, started by the quick-acting micro destruction (micro cracking) in the porous stratified rocks, are taken into account at a rate of the micro cavity.

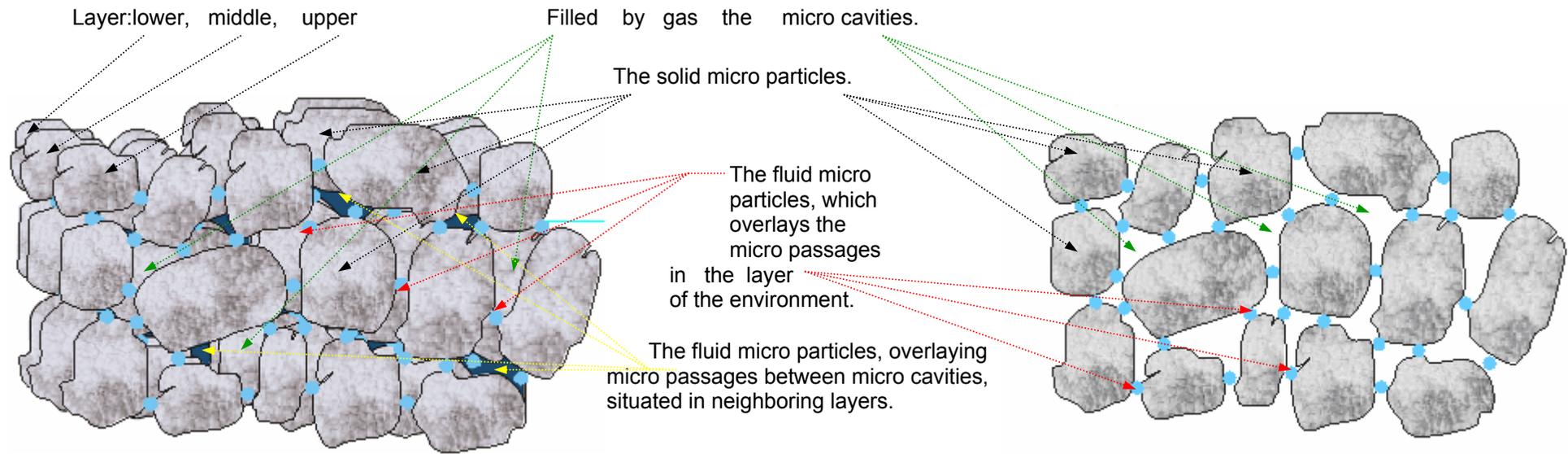


Fig. 1.
The Image of the fragment of the monolith of the environment.

Fig. 2.
The Image of the fragment of layer of environment.

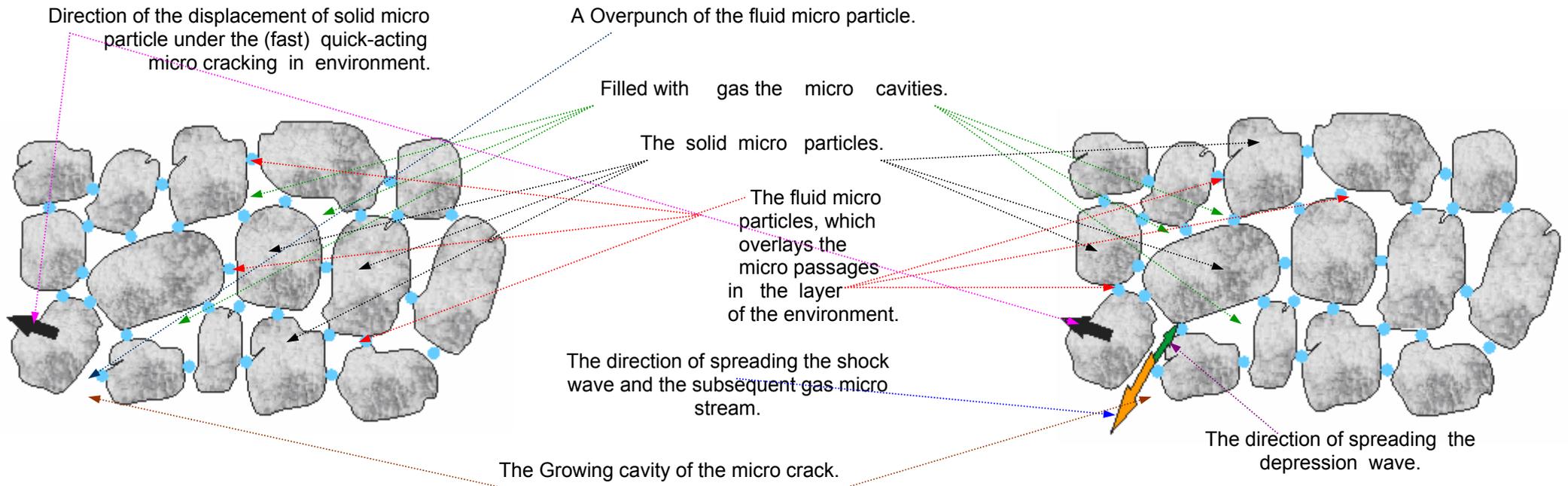


Fig. 3.
The Instantaneous appearance of the cavity of micro crack in layer of the environment.

Fig. 4.
The Spreading the shock wave and the subsequent gas micro stream and the depression wave at the instantaneous appearance of the cavity of micro crack in layer of the environment.

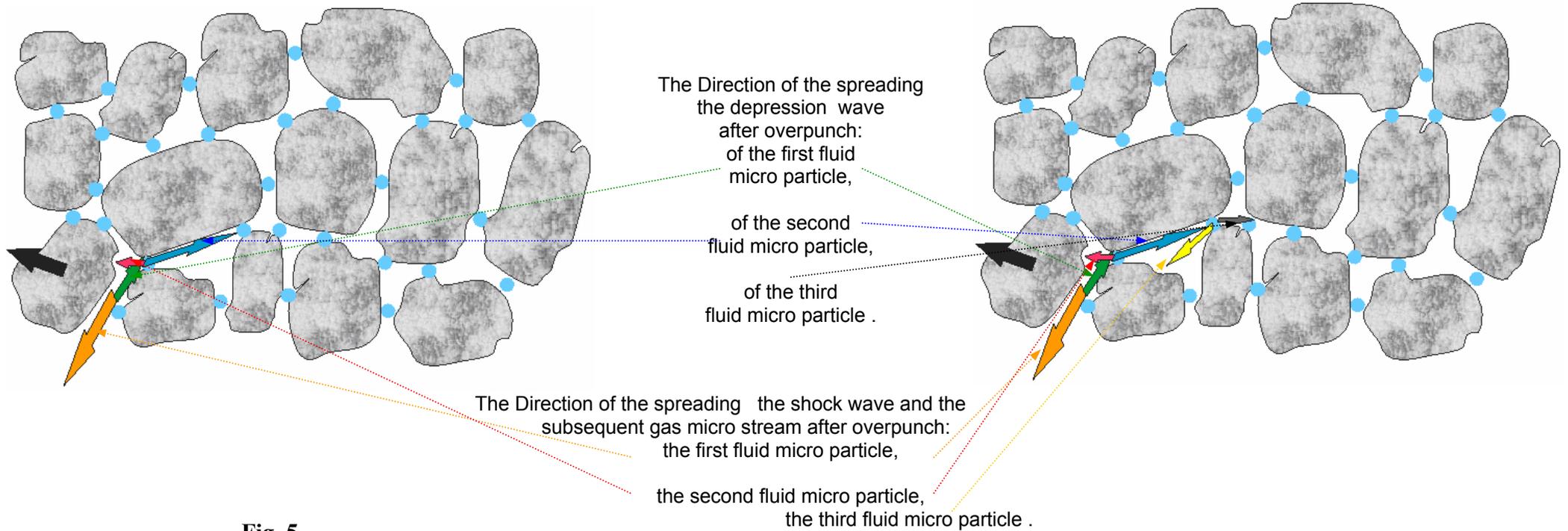


Fig. 5.
The Overpunch of the first and the second fluid micro particles in layer of the environment.

Fig.6.
The Overpunch of the first and the second and the third fluid micro particles in layer of the environment.

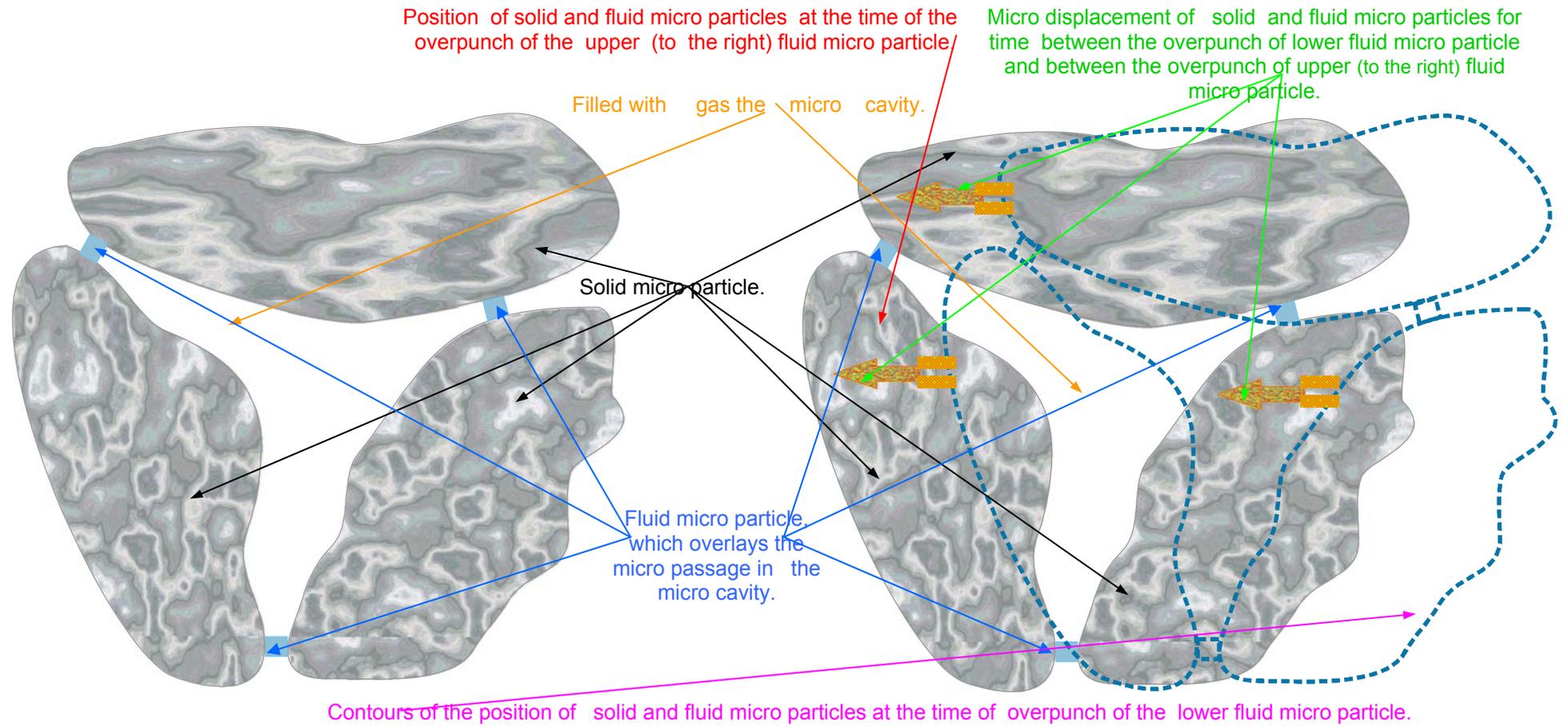


Fig. 7.
Micro cavity, solid and fluid micro particles.

Fig. 8.
Micro displacement of the micro cavity, solid and fluid micro particles per time between two overpunch of fluid micro particles .

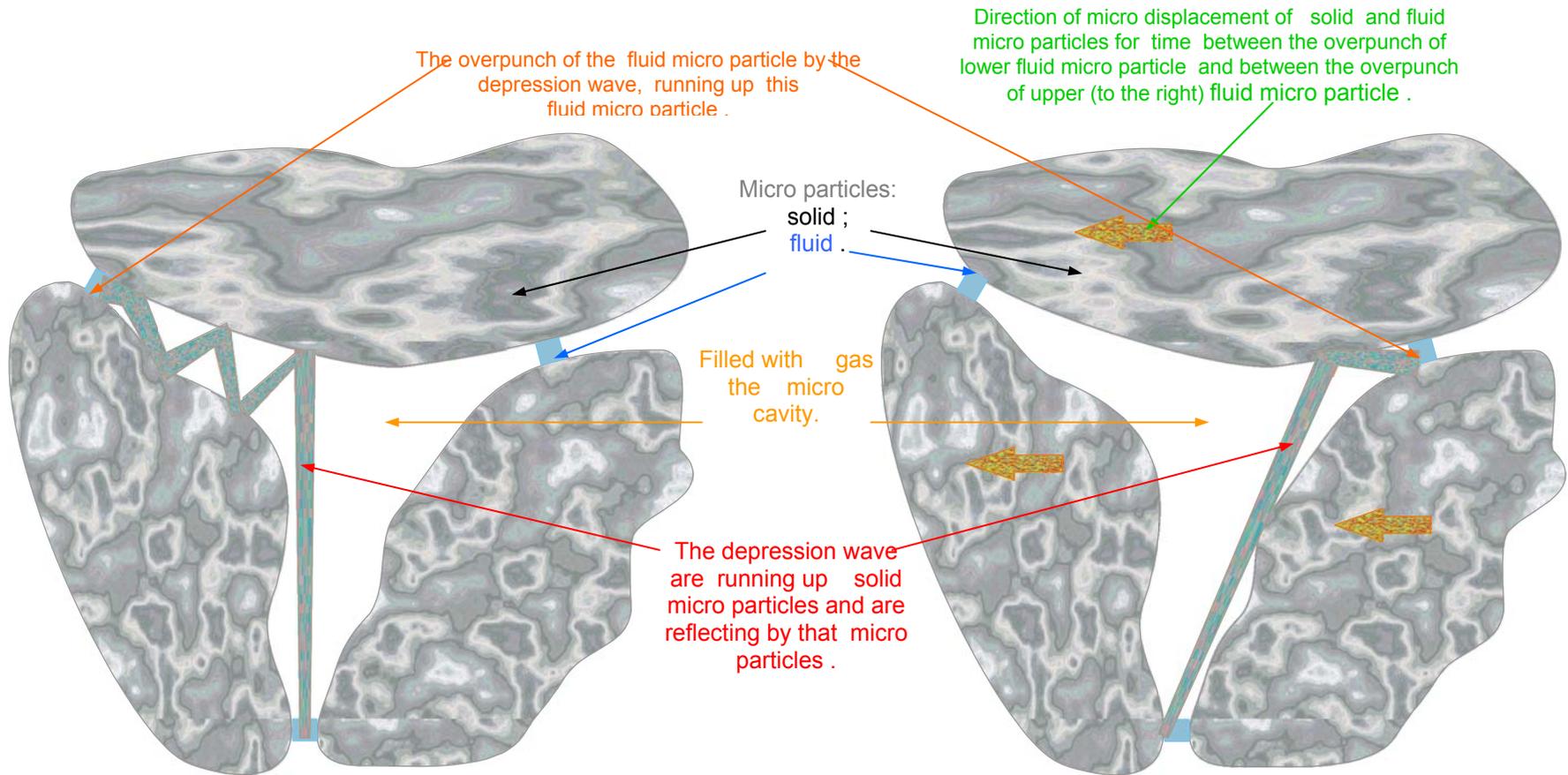


Fig.9.

The overpunch by the depression wave (running up) of the fluid micro particle, which is a part of motionless group, consisting of micro cavity, solid and fluid micro particles .

Fig.10.

The overpunch by the depression wave (running up) of the fluid micro particle, which is a part of mobile group, consisting of micro cavity, solid and fluid micro particles .

The Model of layer of the environment.

The aim of this partition consists in statement of the rules, used in the numerical experiment for study of the patterns, arising in layer of the environment under the quick-acting in the flat layer of the environment of the progressive micro motions of the micro aggregate of the solid and fluid micro particles as the entire.

Exists the great number of the variants of the quick-acting in the flat layer of the environment of the progressive micro motions of the micro aggregate of the solid and fluid micro particles as the entire. By each variant of such micro motions may be created on surface of the land the pattern, consisting of the bented stalks of the plants, differing from the patterns under other variants of the micro motions.

On **Fig.12.** is shown flat model, corresponding to layer of the environment, shown on **Fig.11.**

The elements of the layer of environment (the solid micro particles, the fluid micro particles, the micro cavity, the micro passage) correspond to the elements of model of the layer of environment (the models of solid micro particles, the models of fluid micro particles, the models of micro cavities, the models of micro passages).

The elements of the model of the layer of environment correspond to the elements of a layer of environment.

The object in layer of the environment (for instance, the micro canal), consisting of elements of layer of environment, correspond to the model of the object (for instance, the model of micro canal), consisting of elements of the models of layer of environment, every of which corresponds to one of the elements of the object in the layer of environment.

In model of layer of environment the segment of straight line, representing the models of micro passage, connects the centres of two nearby the models of micro cavities.

The centre each of model of micro cavity is a node point (the node), which connect three models of micro passage.

These three models of micro passages divide the complete angle (with top in node point) into three equal parts under 120° each.

The model of the solid micro particle coincides with hexagon. The side of the hexagon coincides with the model of the micro passage.

Two nearby hexagons separates one model of the micro passage.

The length of model of the micro passage equals to a characteristic linear size of the solid micro particle in layer of the environment, which be divided into square root from number three.

The model of the fluid micro particle is situated in medium of the model of the micro passage.

The micro depression can spreads along model of the micro passage.

The micro depression in model of the layer of the environment correspond to the depression wave, which can spreads in the micro cavities of the layer of the environment.

In model of the layer of environment the value of potential (N) of the micro depression and the value (ζ), by which are characterized the velocity of the spreading of the micro depression in the model, coincide, accordingly, with the value of the potential (N) and with the value (ζ) in the environment.

Moreover, in the model a initial micro cavity exists the correlation $N = N_{zm}$.

The micro depression, which are spreading along the model of the micro passage, and which have value of the potential (N) more than critical value (N_h^*), destroys (overpunch) the model of the fluid micro particle, located on this models of the micro passage, and creates the model of micro canal.

The potential of micro depression in the model of a initial micro cavity is less than the duplicated values of the critical value.

After destruction of the model of the fluid micro particle, the value of the potential (N) of micro depression decreases on one.

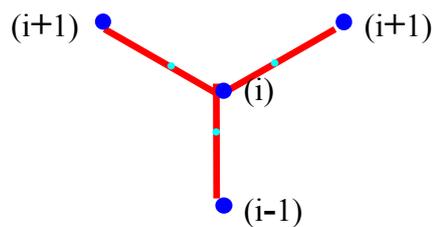
The model of micro canal, consists of models of the micro passages, along which are spreading the micro depressions.

The micro depression, whose potential is equals to critical value or whose potential is less than critical value, does not destroy the model of the fluid micro particle and does not spread along the model of the micro passages.

The model of layer of environment is located on the Euclidean plane, along which she able to have move as uniform whole.

The sizes and the mutual location of the elements of the model of layer of environment, when the model are moving along the Euclidean plane, does not change .

In the model of layer of environment is realized algorithm of the spreading the micro depression, described below on example of the spreading the micro depression between consecutively located $(i-1)$ – ouch, (i) – ouch and $(i+1)$ – ouch node points:



The micro depression spreads from $(i-1)$ – ouch node point (the blue circle) toward (i) – ouch node point along the model of the micro passage (the red segment of straight line), which connects both node points .

Herewith the micro depression destroys the model of the fluid micro particle (the blue point), which located between $(i-1)$ - ouch and (i) - ouch node points.

The micro depression, from (i) - ouch node point are spreading toward one of two $(i+1)$ - ouchs node points along the model of the micro passage, which connects (i) - ouch and mentioned $(i+1)$ - ouch node points .

Herewith, the micro depression destroys the model of the fluid micro particle, located between (i) – ouch and mentioned $(i+1)$ – ouch node point .

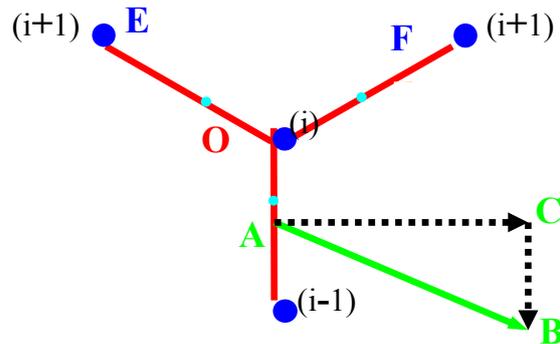
Mentioned $(i+1)$ - ouch node point coincides with the end of one of two the models of the micro passage, which have by a conjoint beginning of (i) - ouch node point.

Nor one of these two the models of the micro passage does not coincide with the model of the micro passage, which connects $(i-1)$ - ouch and (i) - ouch node points.

In motionless (relatively the Euclidean plane) model of layer of environment the mentioned $(i+1)$ - ouch node point with equal probability may be the end of any of two the models of the micro passage.

The mobile model of layer of environment, when spreading the micro depression from $(i-1)$ - ouch node point in (i) - ouch node point , progressively are moving along the Euclidean plane in the direction of vector **AB** on distance comparable with length of the model of the micro passage.

The component **AC** of vector of the displacement **AB** is perpendicular towards the model of the micro passage $(i-1, i)$ and is directed to the right of the model of the micro passage.



Under mentioned moving the mobile model of layer of environment in the direction of vector **AB** the micro depression are spreading in the direction from (i-1) - ouch node point towards (i) - ouch node point .

Two (i+1) - ouchs node points **E** and **F** are located , respectively, on the left and on the right relatively of the model of the micro passage (i-1, i).

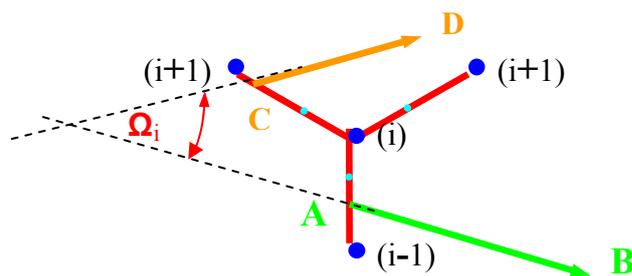
The component **AC** of vector of the displacement **AB** is perpendicular towards the model of the micro passage (i-1, i) and is directed to the right of the model of the micro passage.

In so far as the micro depression in model of layer of environment are corresponding wave of micro depression, therefore the rule of the change the direction of the spreading the micro depression are corresponding the rule of the change of the direction of the spreading of the overpunch of the fluid micro particle in the environment .

Thus from (i) - ouch node point (**O**) the micro depression spreads towards node point **E** along the model of the micro passage **OE**.

If direction of the vector of the moving of the mobile model of layer of environment such a that his perpendicular towards the model of the micro passage (i-1, i) of the component is directing to the left against model of the micro passage , then from (i) - ouch node point (**O**) the micro depression spreads towards node point **F** along the model of the micro passage **OF**.

The direction of the progressive moving of the mobile model of layer of environment when spreading the micro depression from one node point in other node point can be any.



Thus angle Ω_i between two directions of progressive moving (**AB** and **CD**) of the mobile model of layer of environment, which occurs when spreading the micro depression between three (i-1; i; i+1) consecutively located node points , can be any.

At this article from ensemble of the all the manner of progressive displacements to the mobile model of the layer of environment, in further text, be consider of some of the displacement, at which angle Ω_i

between two mentioned directions of the progressive displacement to the mobile model is described by relations:

$$\Omega_i = \text{MOD} \{ \text{ABS}(\Omega_i); (2 \cdot \pi) \} \cdot \{ \text{SIGN}(\Omega_i) \};$$

$$\Omega_i = -(2 \cdot \pi / 360) \cdot [\gamma_i / ((1 - 1/\zeta)^s) + \mathbf{A} \cdot \delta_i], \text{ (the values of angles } \gamma_i \text{ and } \mathbf{A} \text{ are given in the degrees);}$$

$$i = 1, 2, 3, \dots, N_{zm};$$

$$\left[\sum_{\kappa=0}^{s-1} \nu_{\kappa} \right] < i \leq \left[\sum_{\kappa=0}^s \nu_{\kappa} \right];$$

$$\nu_{\kappa} = \begin{cases} \text{Int}[(1 - 1/\zeta)^{\kappa} \cdot (N_{zm}/\zeta)], & \text{если } \zeta > 1, \kappa \geq 0; \\ N_{zm}, & \text{если } \zeta = 1, \kappa = 0; \\ -\text{Int}[N_{zm}/\zeta], & \text{если } \zeta > 1, \kappa < 0; \end{cases};$$

$$s = 0, 1, 2, 3, \dots;$$

$$\delta_i = \begin{cases} 0, & \text{если } \left[\sum_{\kappa=0}^{s-1} \nu_{\kappa} \right] < (i - 1) < i \leq \left[\sum_{\kappa=0}^s \nu_{\kappa} \right]; \\ 2 \cdot (-1)^{s+1}, & \text{если } \left[\sum_{\kappa=0}^{s-1} \nu_{\kappa} \right] = (i - 1) < i \leq \left[\sum_{\kappa=0}^s \nu_{\kappa} \right]; \end{cases}$$

$$\omega_i = \sum_{\kappa=1}^i \Omega_{\kappa}$$

Int[C] – rounds a number [C] down to the nearest integer;

ABS(C) – returns the absolute value of a number [C], a number without its sign. Number [C] is the real number for which you want the absolute value.;

$$\text{MOD} \{ C; d \} = C - d \cdot \text{Int}[C / d].$$

$$\{ \text{SIGN}(\Omega_i) \} = \begin{cases} 1, & \text{if } (\Omega_i) > 0; \\ 0, & \text{if } (\Omega_i) = 0; \\ -1, & \text{if } (\Omega_i) < 0. \end{cases}$$

For simplification of calculation, at study stage of the spreading of the micro depression, be ignore some detail to models, which in this case accept the type, shown on **Fig.13**.

At instant destruction of the model of solid micro particle in one of six the node points, verging towards decaying model of solid micro particle, the micro depression arises and spreads along the model of micro passage (**Fig.14**).

Micro depression, spreading along model of the micro passage, falls into node point, representing the second end of the model of the micro passage, on which micro depression spreads.

In this node point the micro depression changes the direction of the spreading and are choosing one of two the directions of two other models of the micro passages the ends of that coincide with this node point.

In the event of the motionless model of the layer of environment the change to node point of the direction of the spreading of the micro depression occurs by casual path (**Fig.15**).

The outlines of the model of micro canal, arising when spreading the micro depression in the motionless model of the layer of environment, are varying by the casual path .

The direction of the progressive displacement of the mobile model, in the event of the mobile model of the layer of environment, control the change (in node point) of the direction of the spreading the micro depression .

On **Fig.16**, **Fig.17** is shown influence on the spreading of the micro depression, accordingly , of one of the variants of the constant direction and one of the combinations of the variable directions of the progressive displacement of the mobile model of the layer of environment.

The Influence, shown on **Fig.16**, **Fig.17**, of the progressive displacement of the mobile model of the layer of environment eliminates the casual path nature of the spreading the micro depression, and does predictable the direction of the spreading .

Fig.11.
The Fragment of layer of the environment .
By the Black numerals
are numbered filled with gas the
micro cavities .
By the Red numerals
are numbered solid micro particles .
By the Blue circles
are marked the positions of fluid micro
particles, who are closing the micro
passages between micro cavities .

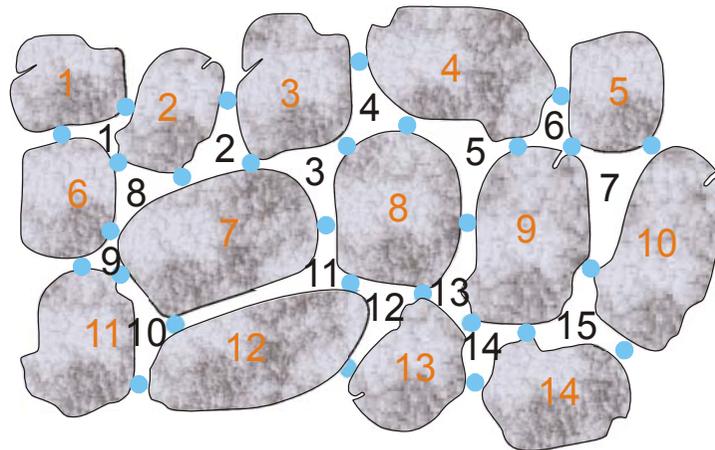
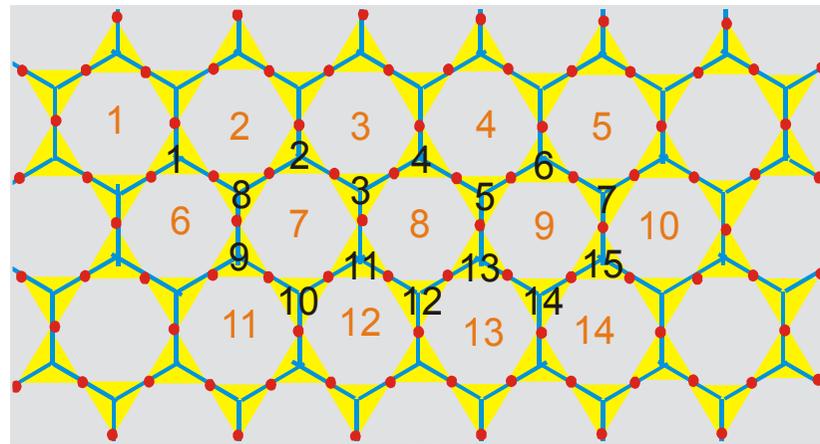


Fig.12.
The Model of the layer (which are shown
on Fig.11.) of environment .
By the Black numerals **are numbered**
models of micro cavities (the yellow
triangles) .
By the Red numerals **are numbered**
models of solid micro particles (the gray
hexagons) .
By the Red points **are marked models of**
fluid micro particles .
By the Blue segments of straight line
are marked models of the micro passages
between micro cavities.

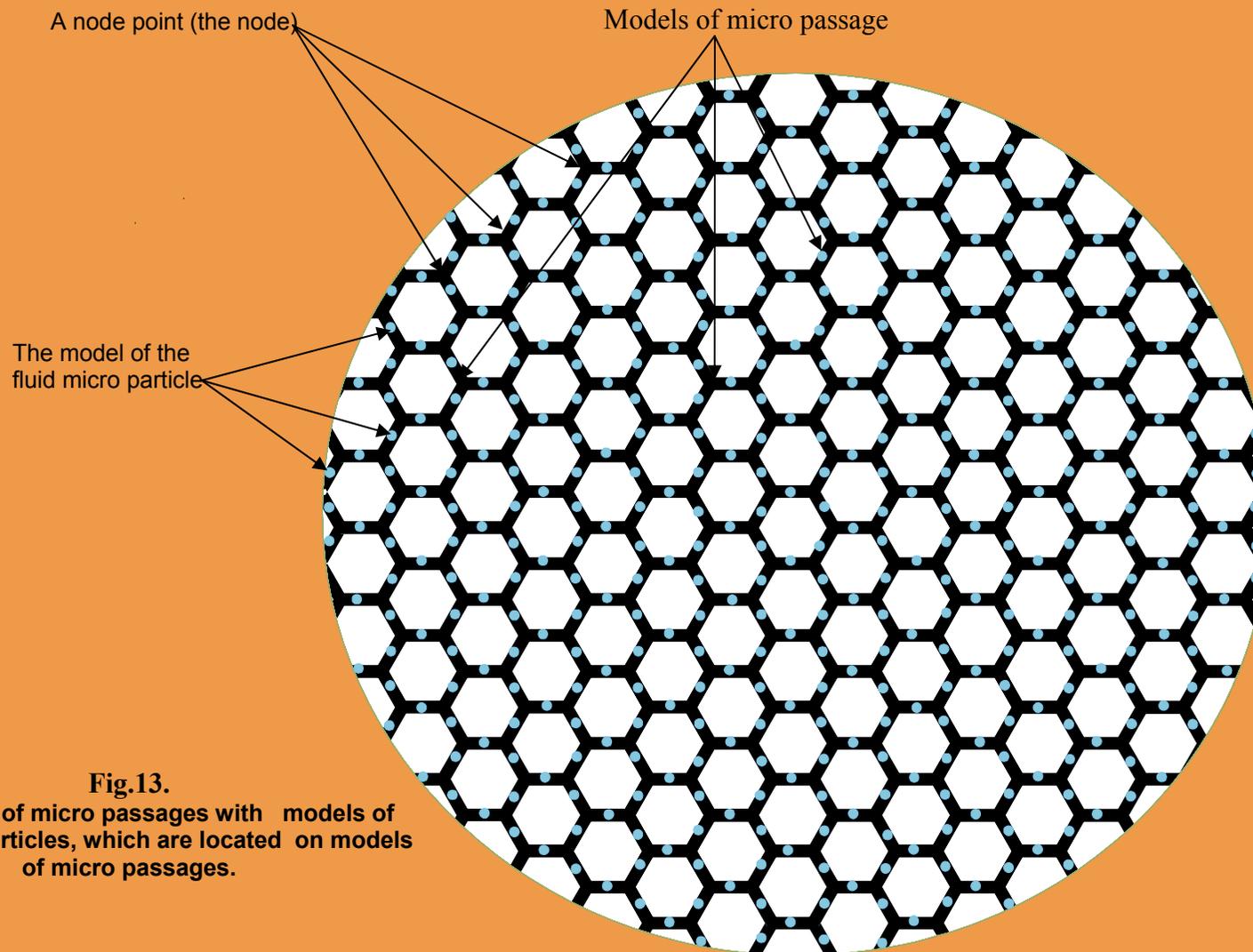


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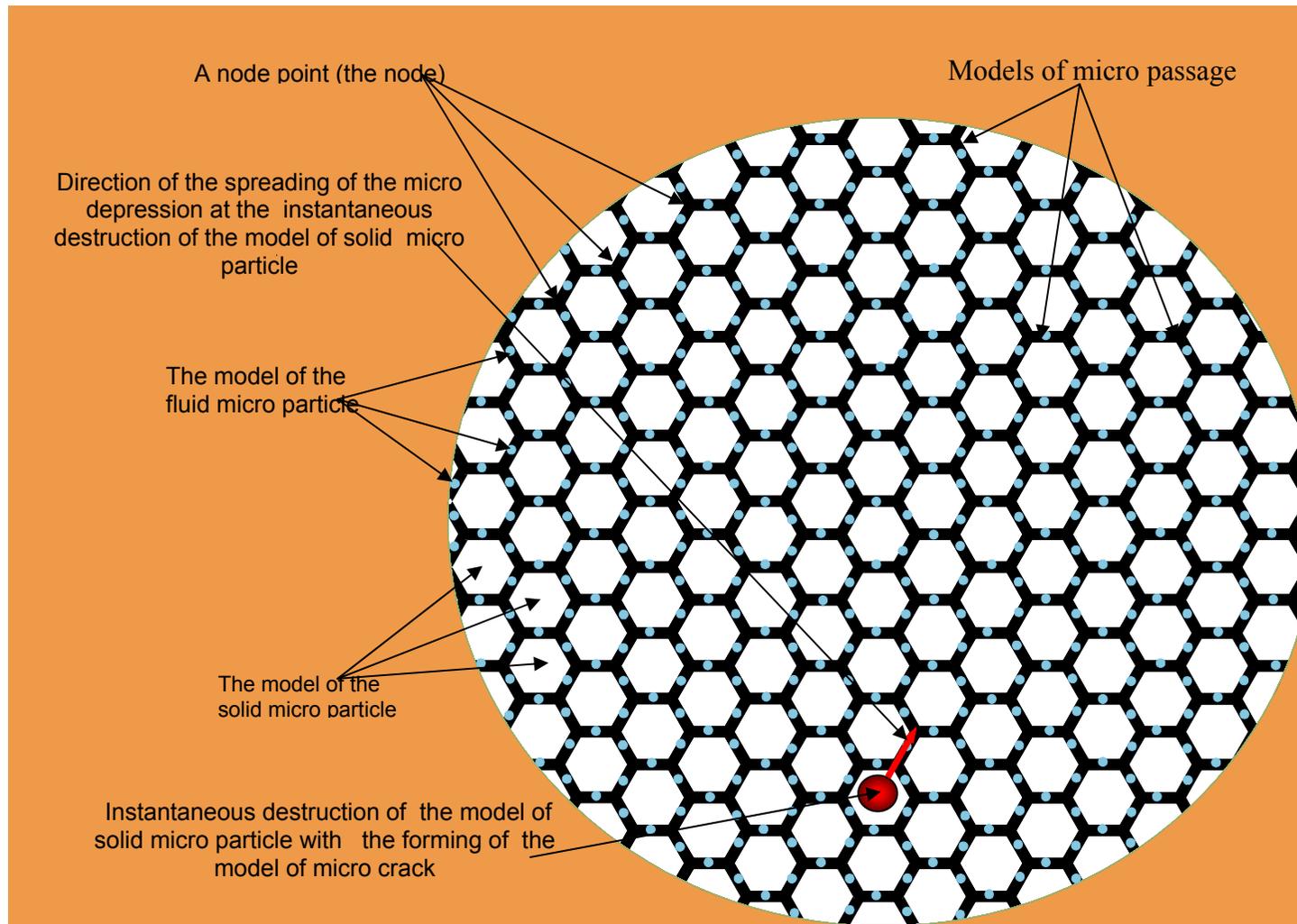


Fig.14.

Spreading of micro depression at instantaneous destruction of the model of solid micro particle .

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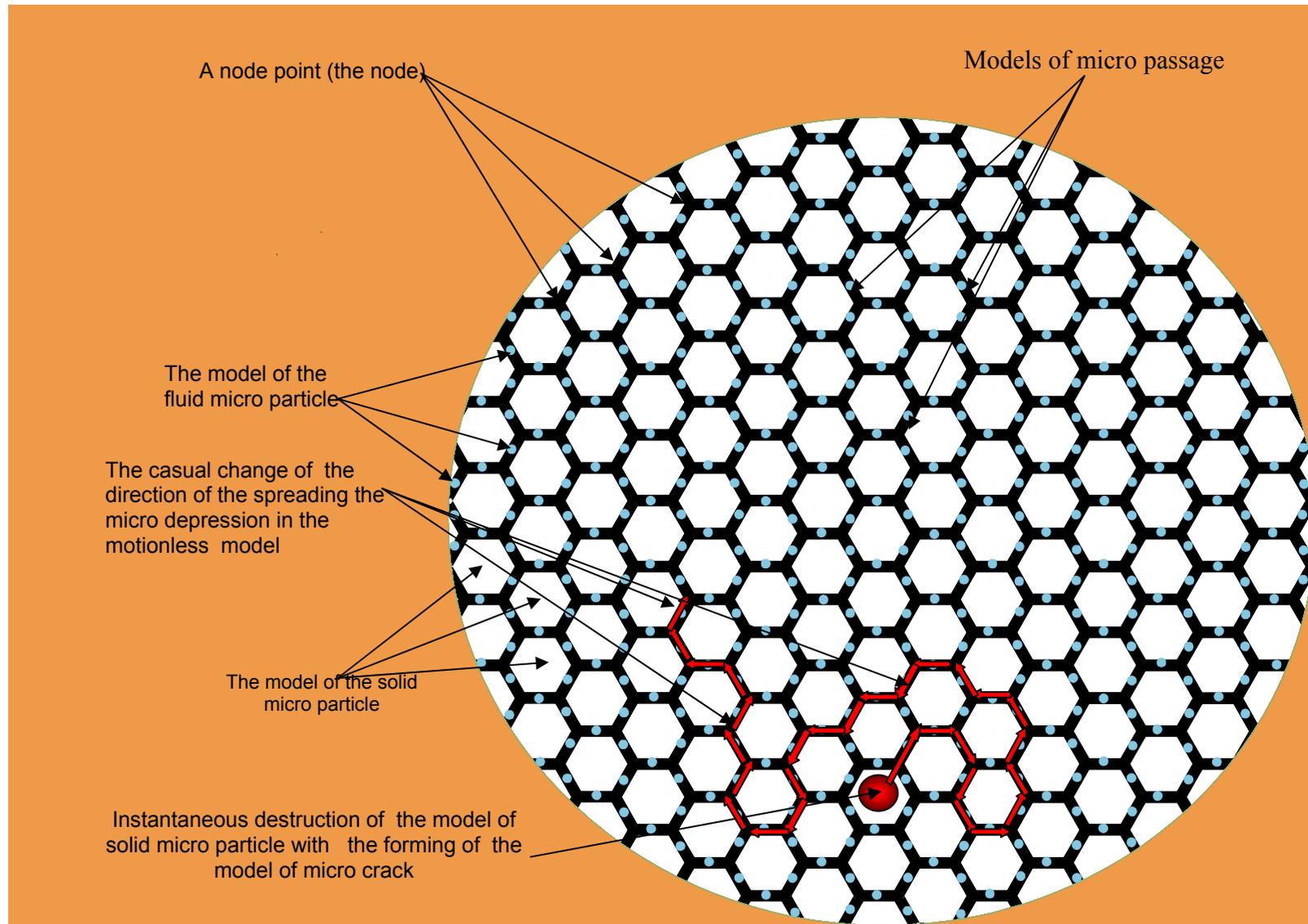
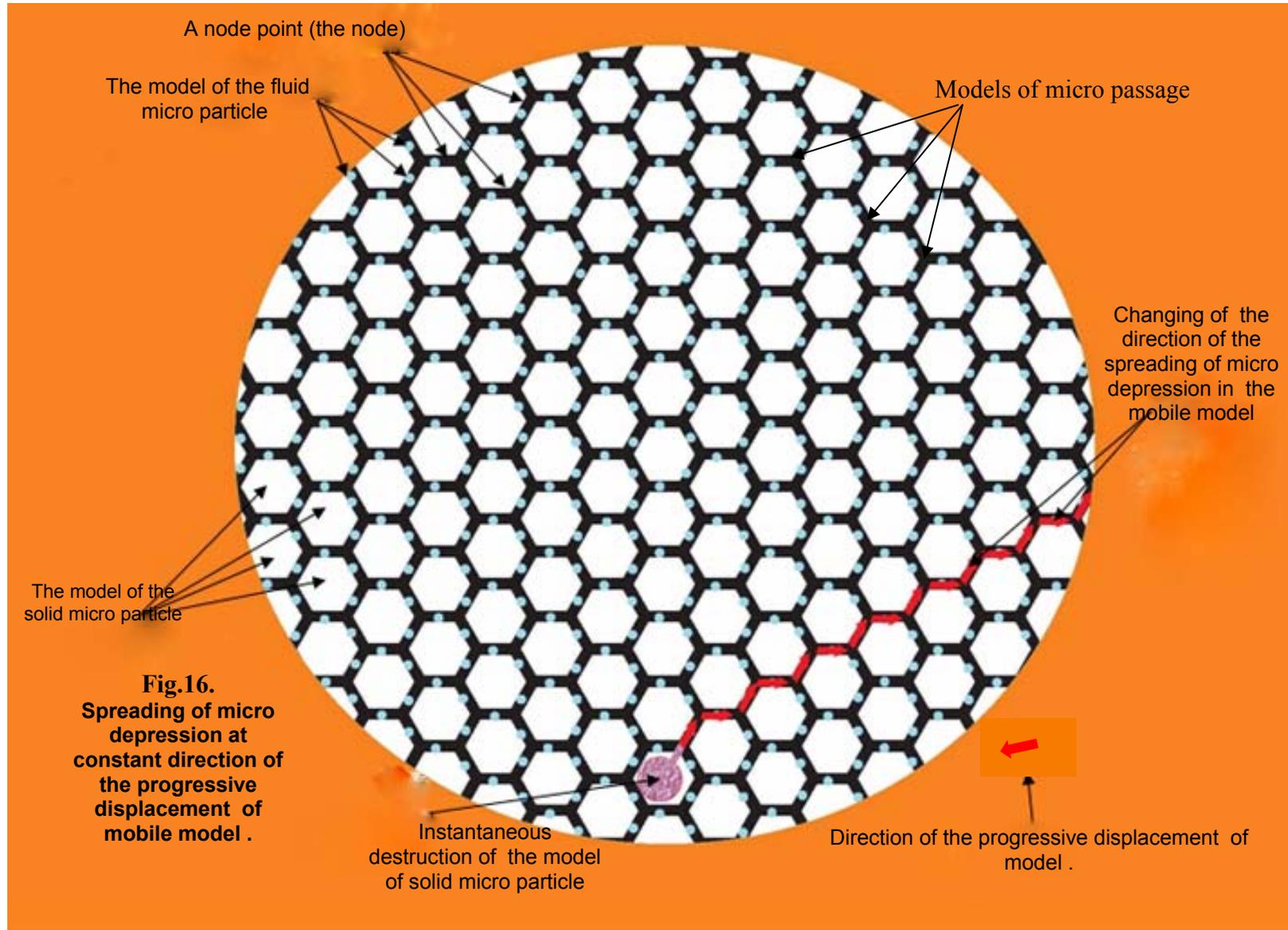


Рис.15.

The casual change of the direction of the spreading the micro depression in the motionless model.

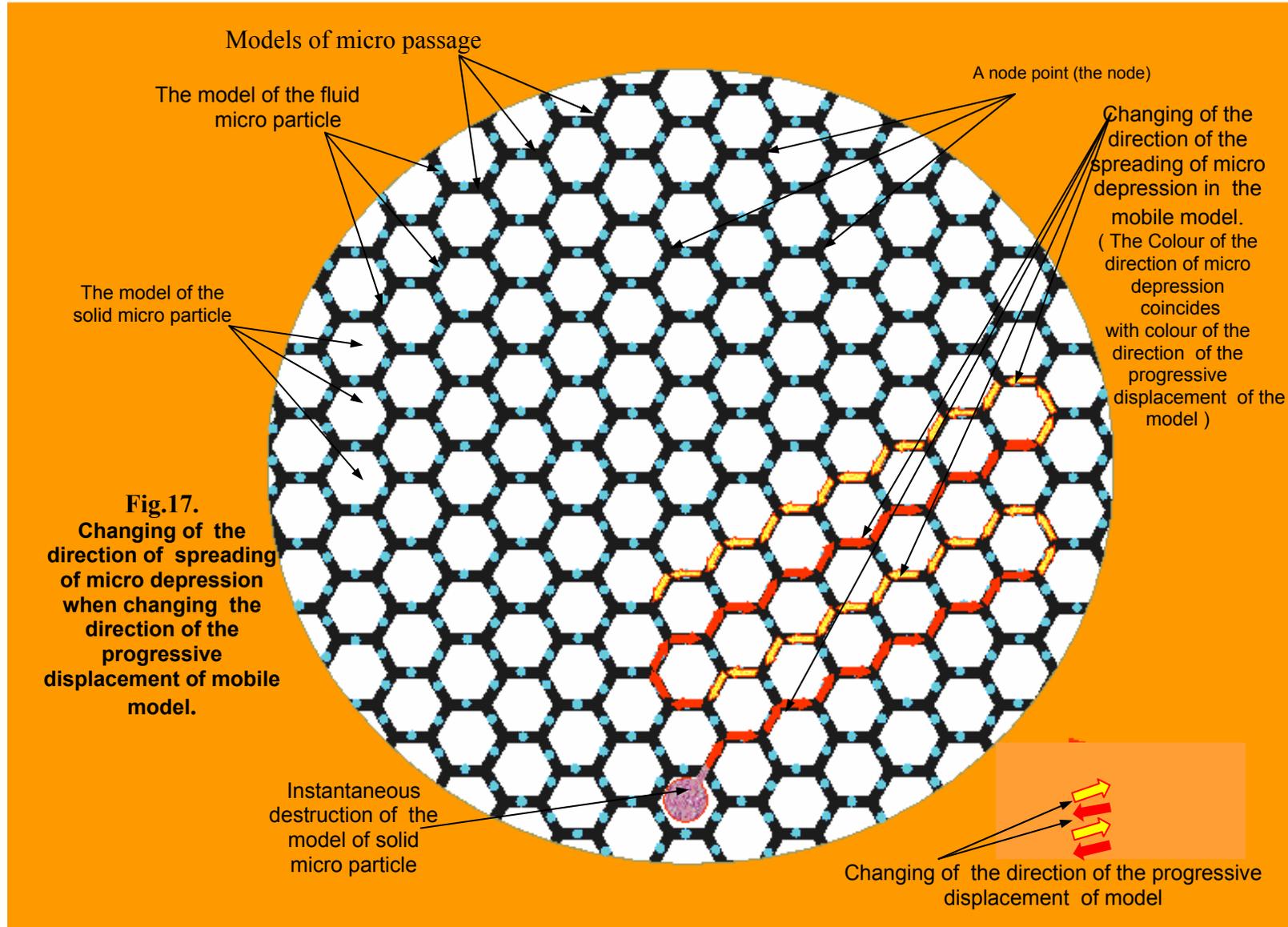


THE PATTERNS OF "CROP CIRCLES" ARE CREATING BY MICRO PHYSICAL PHENOMENA

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The Numerical experiment.

The model of the layer of environment is a base of the numerical experiment on making the images in the layer of environment.

Images are received, in the numerical experiment, for the two variants. In first variant (within plane of the layer of environment) occurs the fast-acting progressive displacement of the micro aggregate of the solid and fluid micro particles (as one integer). Another variant (within plane of the layer of environment) not has of the fast-acting progressive displacement of the micro aggregate of the solid and fluid micro particles (as one integer).

In the numerical experiment are determined coordinates **65614** of the node points, through which the micro depression spreads.

From the node points (whose coordinates was calculated) and from the segments of straight line (which connects this node points) are formed the images, shown on **Fig.18 - 36**.

On **Fig.18 - 19** are shown images, created by casual spreading the micro depression in motionless flat model of the layer of environment.

Introduction to raw data (of the numerical experiment) parameters of the progressive displacement the micro aggregate of the solid and fluid micro particles (being considered, as one integer), normalizes the spreading the micro depression.

Ranked spreading of the micro depression creates the varied images, including images of the geometric figures (**Fig.20 - 28, 30-36**).

Towards each, from images, shown on **Fig.20 - 36**, is enclosed the graph (the angle of the direction at the radians relatively of a number of the node point, through which is spreading of the micro depression) of the change of the direction fast-acting within plane of the layer of environment the progressive displacement of the micro aggregate of the solid and fluid micro particles (being considered, as one integer).

The Basic formulas, used at the numerical experiment for obtaining of the images, which is shown on **Fig.18 - 36**, is described at **APPENDIX**.

The raw data, which be not said in **APPENDIX**, specify at the inscriptions, by which equip the drawings (Fig.).

Lettering of the raw datas coincides with lettering of the datas in the foregoing partitions of this article. For majority of images, got in the numerical experiment, exists the analogues amongst images "**Crop Circle**", which was discovered by the watchers in world.

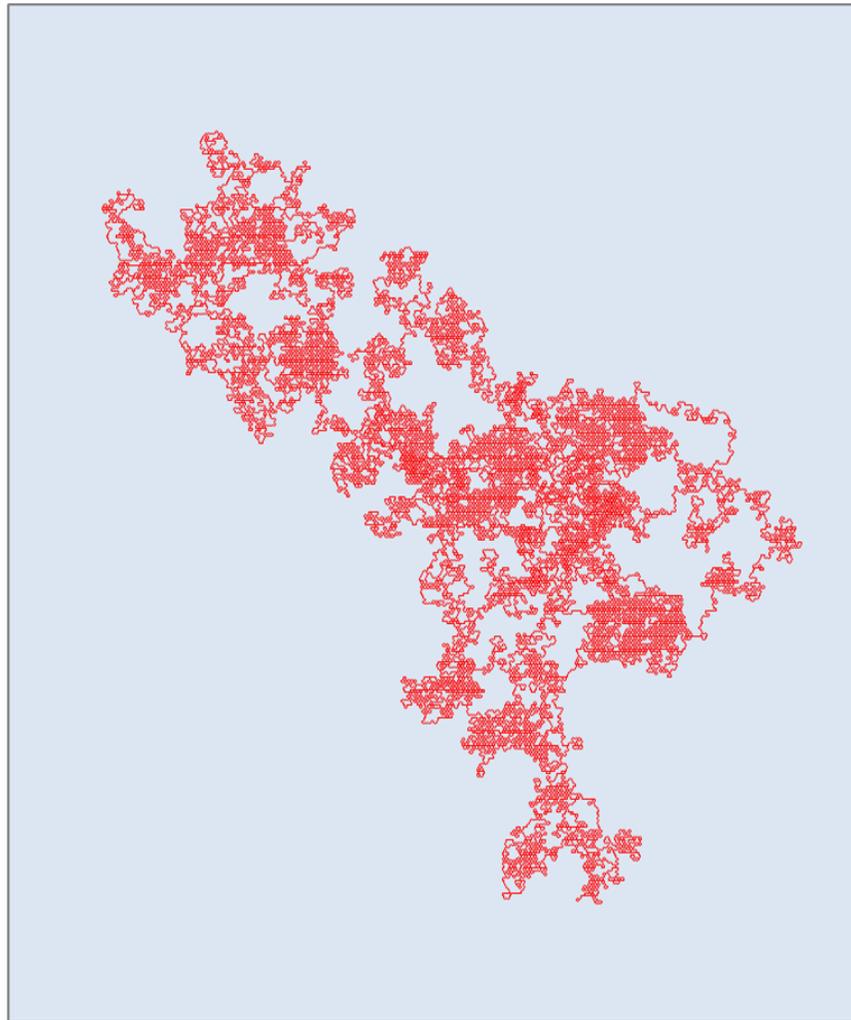
Amongst them, such well-known analogues as an circles, spirals, correct polygons, stars and others.

Alongside with images of the flat objects, in the numerical experiment are received images (**Fig. 35-36**), which possible is perceive as drawings (Fig.) of three-dimensional objects.

Shown on **Fig.18 - 36** images, constitutes the measly part of images, which are arising at fast-acting, within plane of the layer of environment, the progressive displacement of the micro aggregate of the solid and fluid micro particles (being considered, as one integer).

Fig.18.
The image, created by
casual spreading of
micro depression in
motionless model of
layer of environment
(AQ21=0) .

$(\lambda=0; \gamma'_i=0; N_{zm}=6 \cdot 10^{12};$
 $\zeta=2 \cdot 10^{10}; A=0; \gamma''_i=0)$



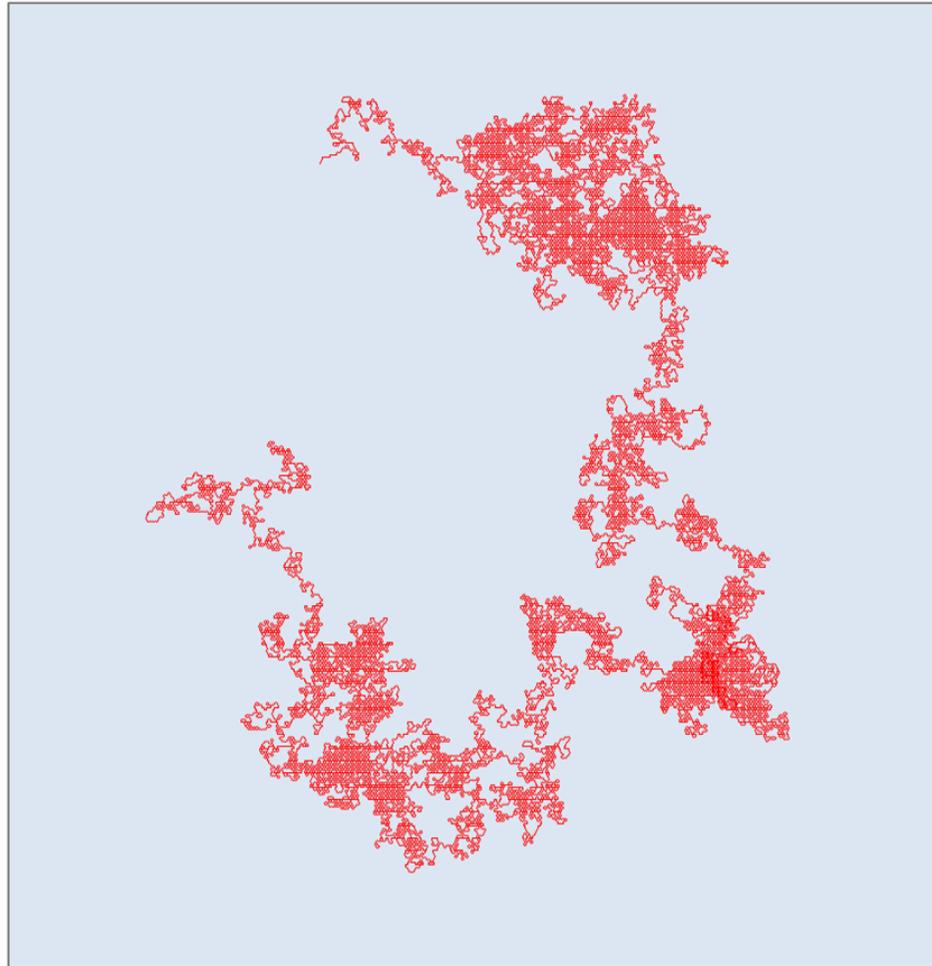
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Fig.19.
The Image, created
by casual spreading
of micro depression
in motionless
model of layer of
environment
(AQ21=0) .
 $(\lambda=0; \gamma'_i=0;$
 $N_{zm}=6 \cdot 10^{12};$
 $\zeta=2 \cdot 10^{10}; A=0; \gamma''_i=0)$

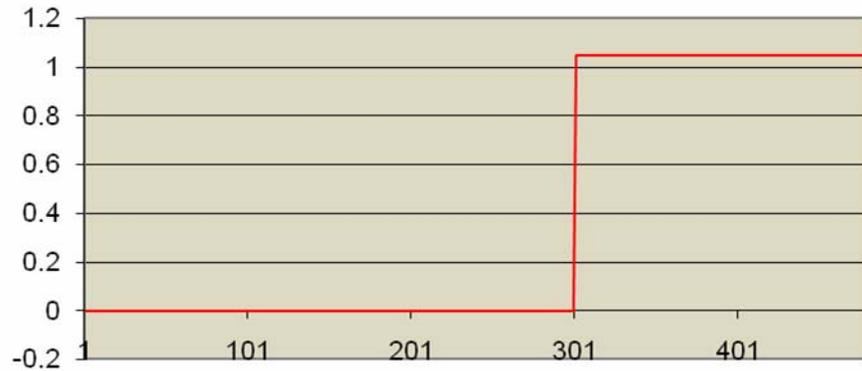


THE PATTERNS OF "CROP CIRCLES" ARE CREATING BY MICRO PHYSICAL PHENOMENA

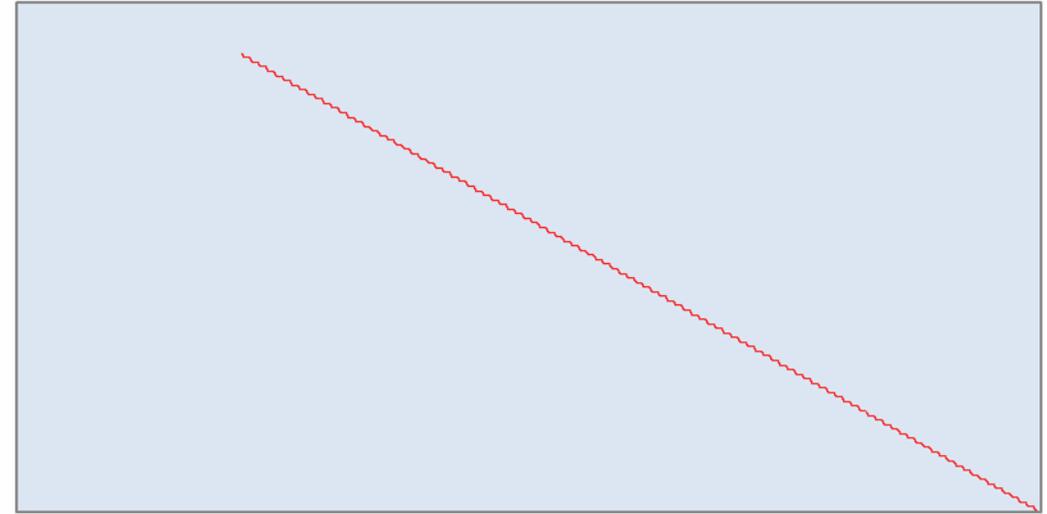
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The Angle (radian) of the direction progressive micro displacement of the micro aggregate of the solid and fluid micro particles (being considered, as one integer) relatively of number of node point, in which micro depression have spreades.



The Image of straight line, created by the spreading of micro depression in the mobile model of layer of environment.

$$(\lambda=0; \gamma'_i=6,1 \cdot 10^{-5}; N_{zm}=6 \cdot 10^{12}; \zeta=2 \cdot 10^{10}; A=-30; \gamma''_i=0)$$

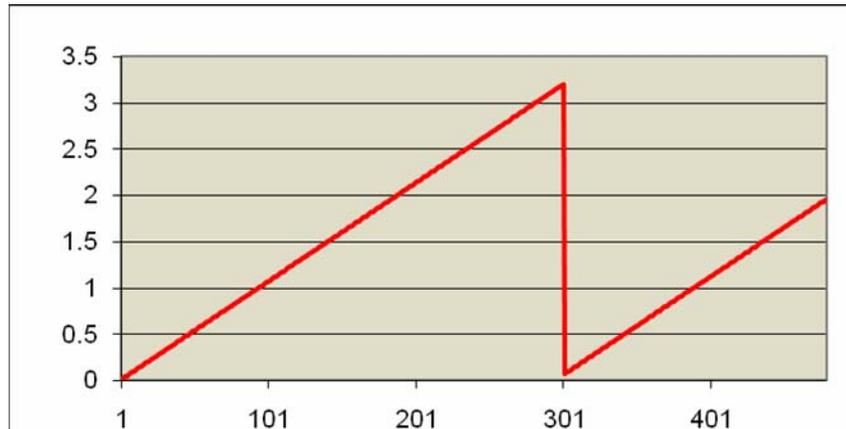
Fig.20.

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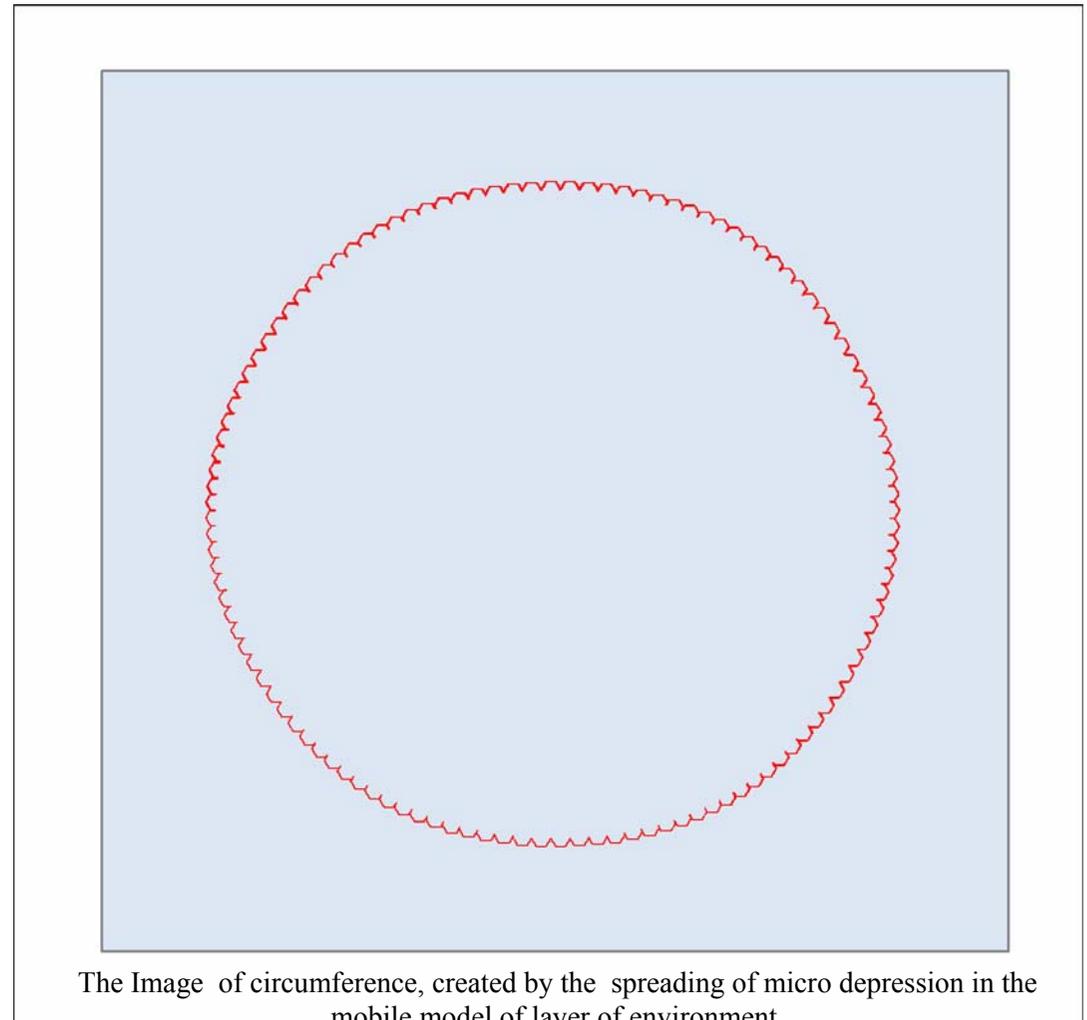
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The Angle (radian) of the direction progressive micro displacement of the micro aggregate of the solid and fluid micro particles (being considered, as one integer) relatively of number of node point, in which micro depression have spreads.

Fig.21.



The Image of circumference, created by the spreading of micro depression in the mobile model of layer of environment.

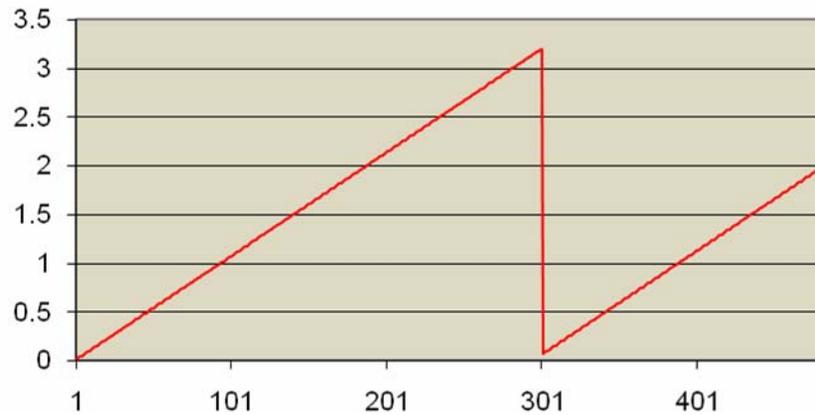
$$(\lambda=0; \gamma'_i=-0,610005; N_{zm}=6 \cdot 10^{12}; \zeta=2 \cdot 10^{10}; A=90; \gamma''_i=0)$$

THE PATTERNS OF "CROP CIRCLES" ARE CREATING BY MICRO PHYSICAL PHENOMENA

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The Angle (radian) of the direction progressive micro displacement of the micro aggregate of the solid and fluid micro particles (being considered, as one integer) relatively of number of node point, in which micro depression have spreads.

The Image of spiral, created by the spreading of micro depression in the mobile model of layer of environment. (Turn clockwise)

$$(\lambda=0; \gamma'_i=-0,610001; N_{zm}=1,5 \cdot 10^5;$$

$$\zeta=5,0 \cdot 10^2; A=90; \gamma''_i=0)$$

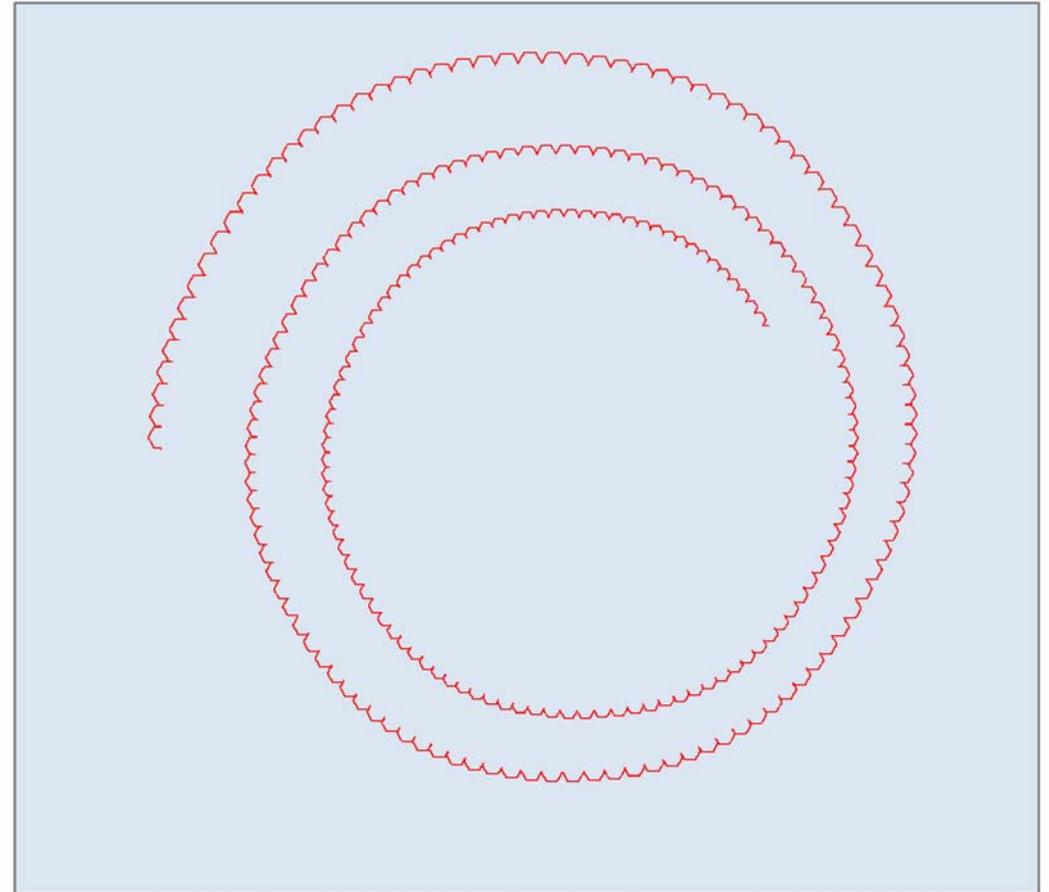


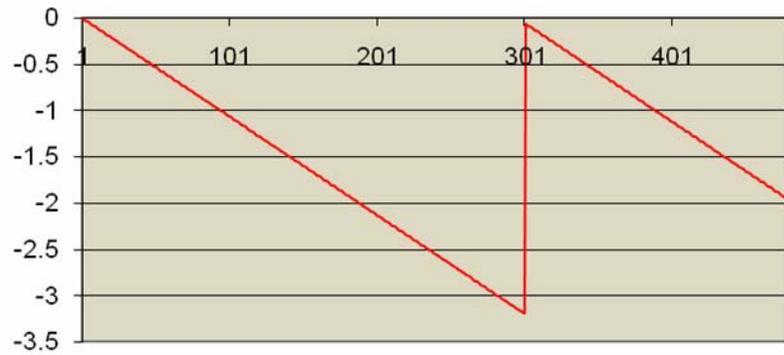
Fig.22

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The Angle (radian) of the direction progressive micro displacement of the micro aggregate of the solid and fluid micro particles (being considered, as one integer) relatively of number of node point, in which micro depression have spreads.

The Image of spiral, created by the spreading of micro depression in the mobile model of layer of environment.

(Turn counterclockwise)

($\lambda=0$;

$\gamma'_i = 0,610001$; $N_{zm} = 1,5 \cdot 10^5$;

$\zeta = 5,0 \cdot 10^2$; $A = 90$; $\gamma''_i = 0$)

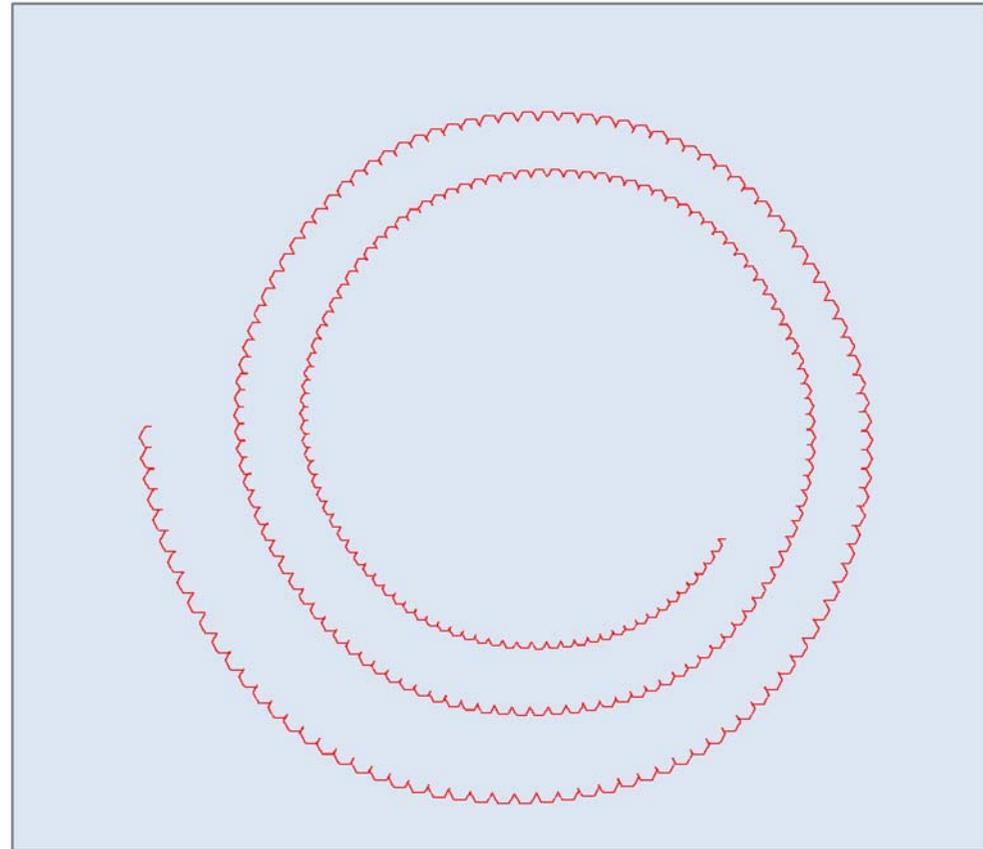


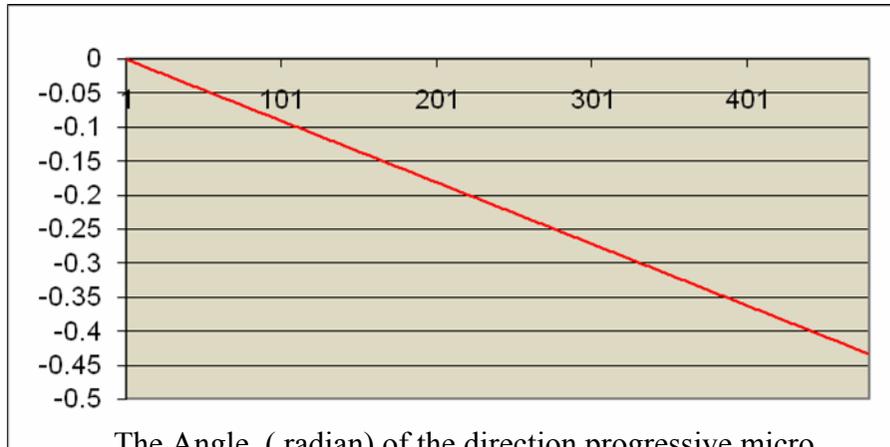
Fig.23

THE PATTERNS OF "CROP CIRCLES" ARE CREATING BY MICRO PHYSICAL PHENOMENA

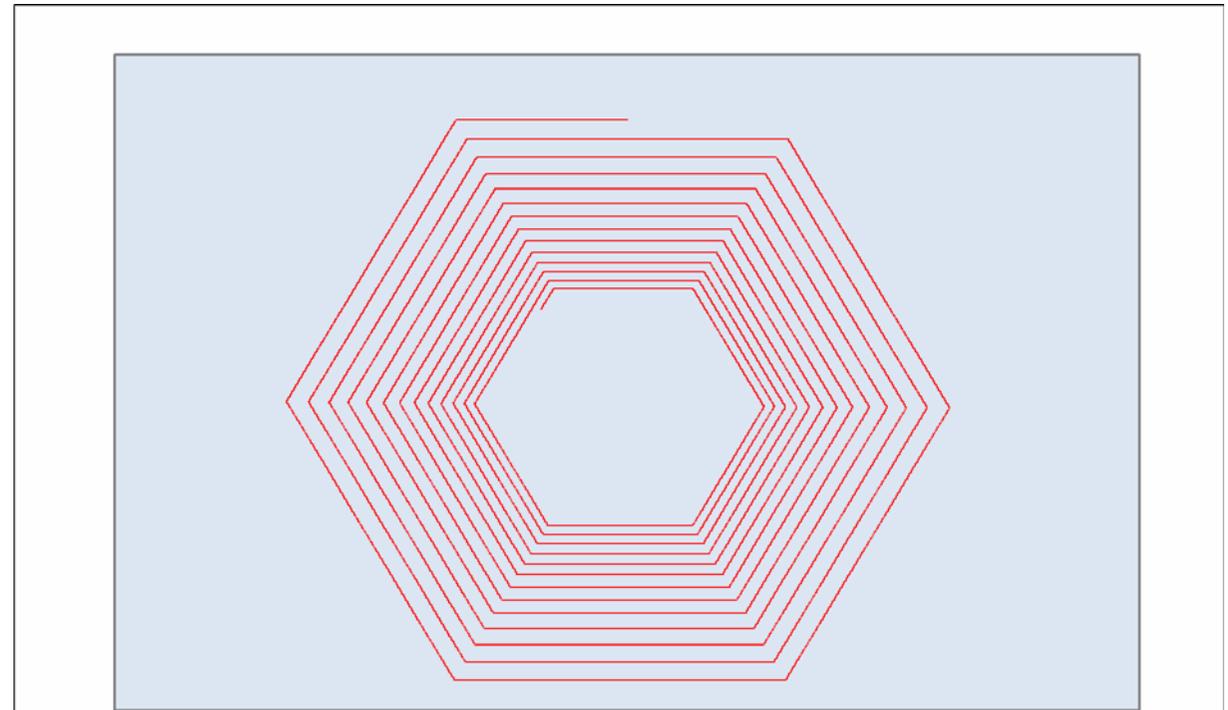
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The Angle (radian) of the direction progressive micro displacement of the micro aggregate of the solid and fluid micro particles (being considered, as one integer) relatively of number of node point, in which micro depression have spreades .



The Image , created by the spreading of micro depression in the mobile model of layer of environment. (Turn counterclockwise).

$$(\lambda=0; \gamma'_i=0,0518; N_{zm}=10^5; \zeta=10^3; A=0; \gamma''_i=0)$$

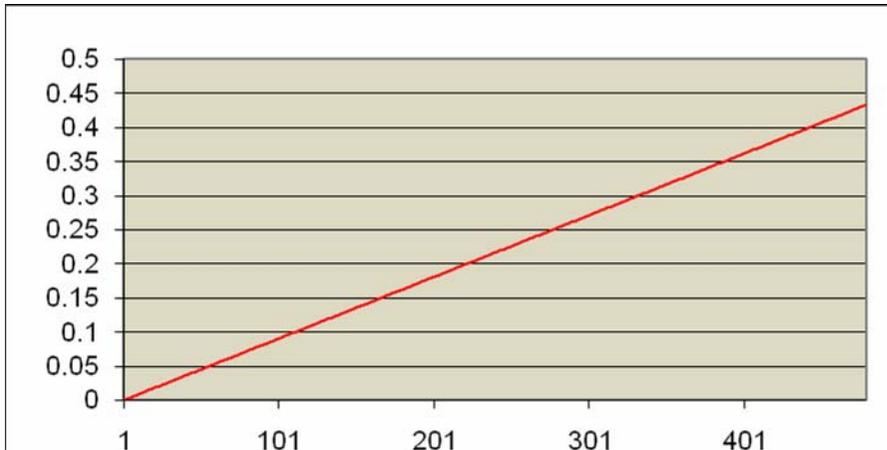
Fig.24

THE PATTERNS OF "CROP CIRCLES" ARE CREATING BY MICRO PHYSICAL PHENOMENA

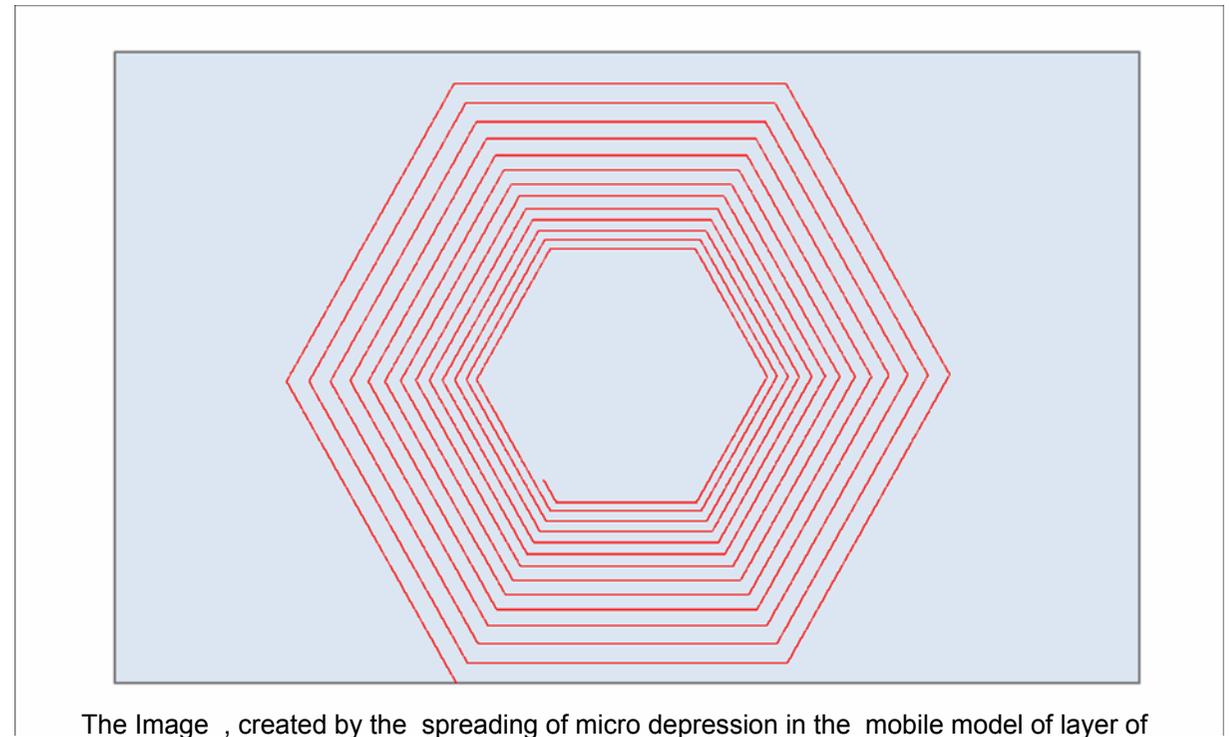
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The Angle (radian) of the direction progressive micro displacement of the micro aggregate of the solid and fluid micro particles (being considered, as one integer) relatively of number of node point, in which micro depression have spreads



The Image, created by the spreading of micro depression in the mobile model of layer of environment. (Turn clockwise)

$$(\chi=0; \gamma'_i = -0,0518; N_{zm}=10^5; \zeta=10^3; A=0; \gamma''_i=0)$$

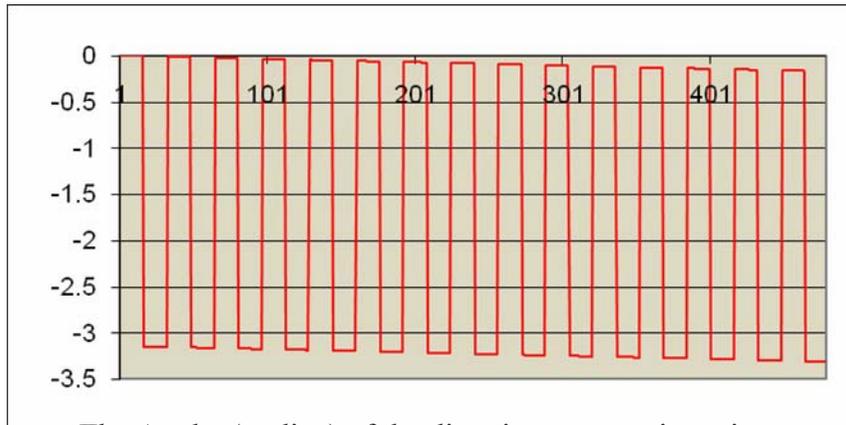
Fig.25

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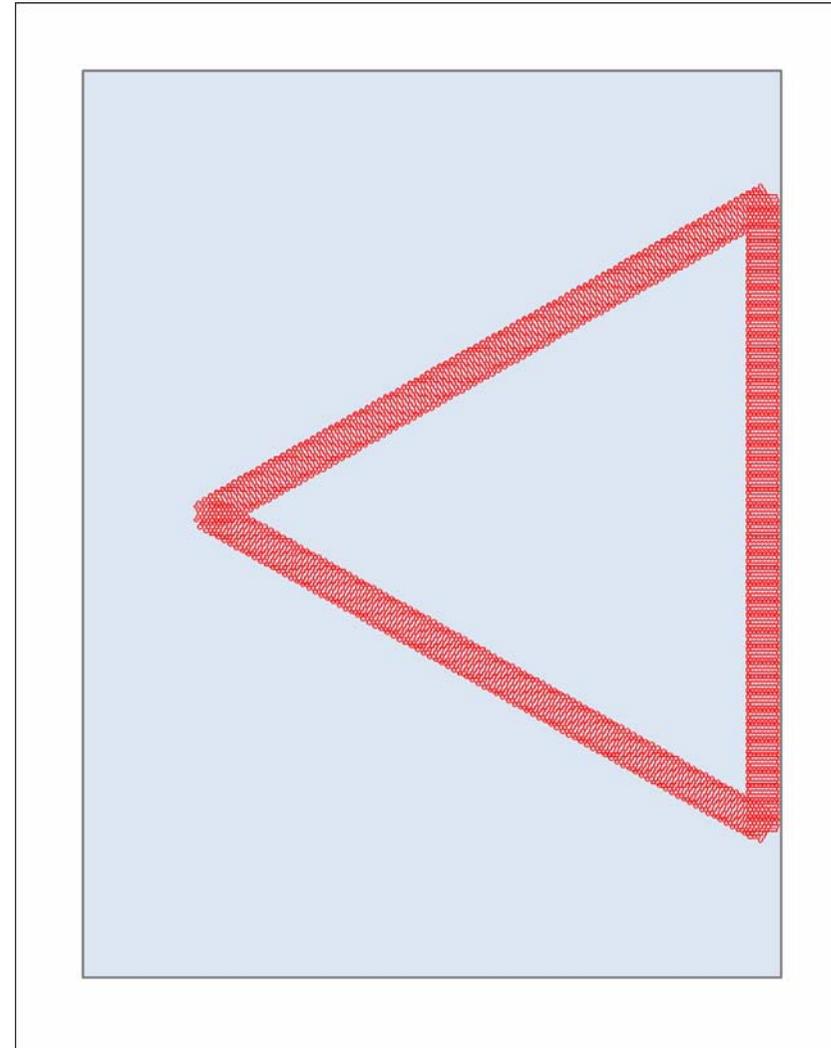


The Angle (radian) of the direction progressive micro displacement of the micro aggregate of the solid and fluid micro particles (being considered, as one integer) relatively of number of node point, in which micro depression have spreads.

The Image of triangle, created by the spreading of micro depression in the mobile model of layer of environment.

$$(\lambda=0; \gamma'_i=0,0205; N_{zm}=6,4 \cdot 10^{12}; \\ \zeta=4 \cdot 10^{11}; A=90; \gamma''_i=0)$$

Fig.26



THE PATTERNS OF "CROP CIRCLES" ARE CREATING BY MICRO PHYSICAL PHENOMENA

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The Angle (radian) of the direction progressive micro displacement of the micro aggregate of the solid and fluid micro particles (being considered, as one integer) relatively of number of node point, in which micro depression have spreads.

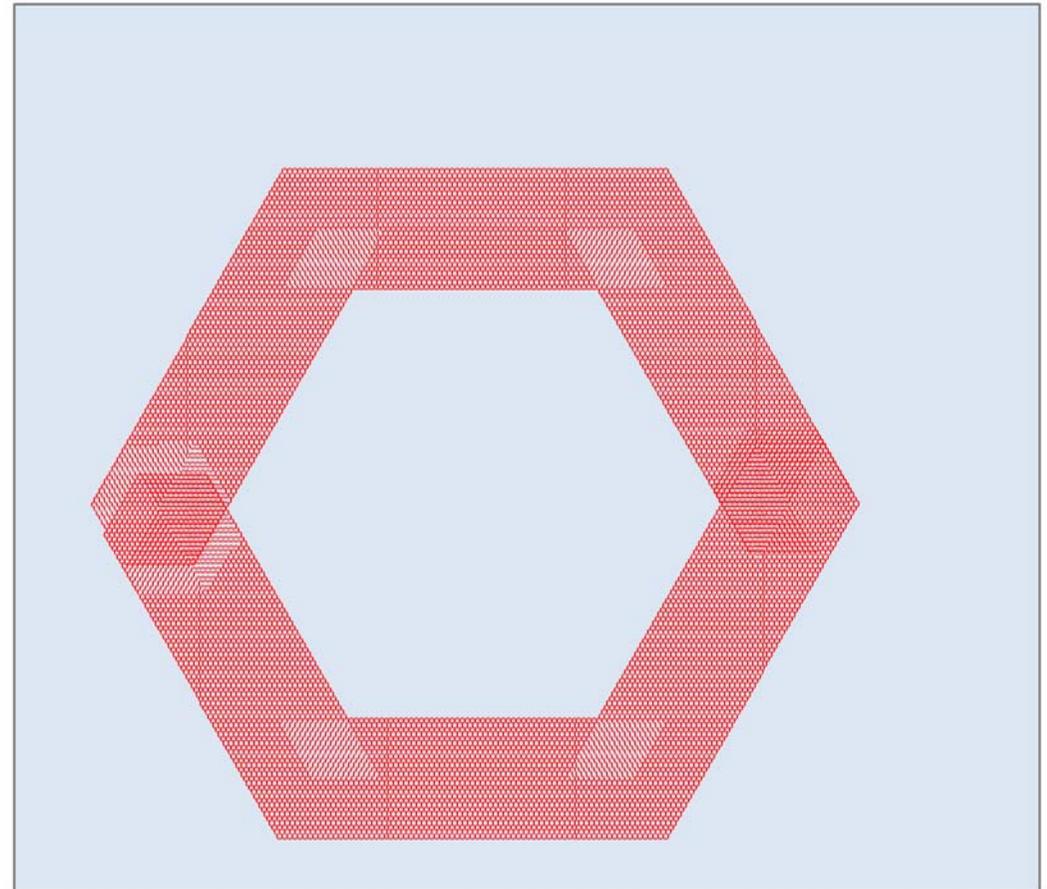
The Image of hexagon, created by the spreading of micro depression in the mobile model of layer of environment.

$$(\lambda=0; \gamma'_i=2,19505;$$

$$N_{zm}=6,0 \cdot 10^{12}; \zeta=6 \cdot 10^{10}; A=0;$$

$$\gamma''_i=0)$$

Fig.27

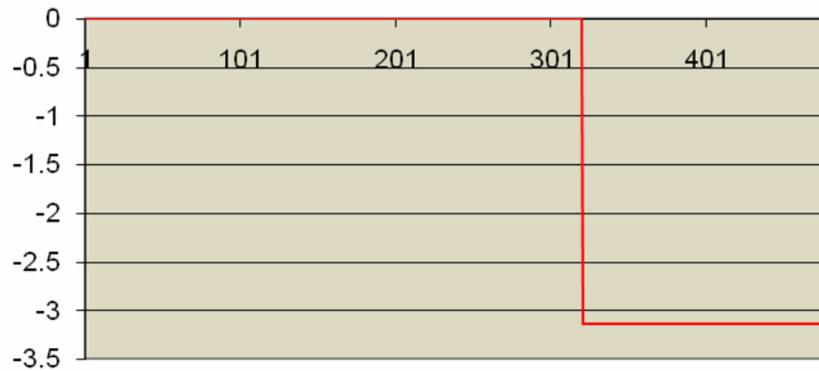


THE PATTERNS OF "CROP CIRCLES" ARE CREATING BY MICRO PHYSICAL PHENOMENA

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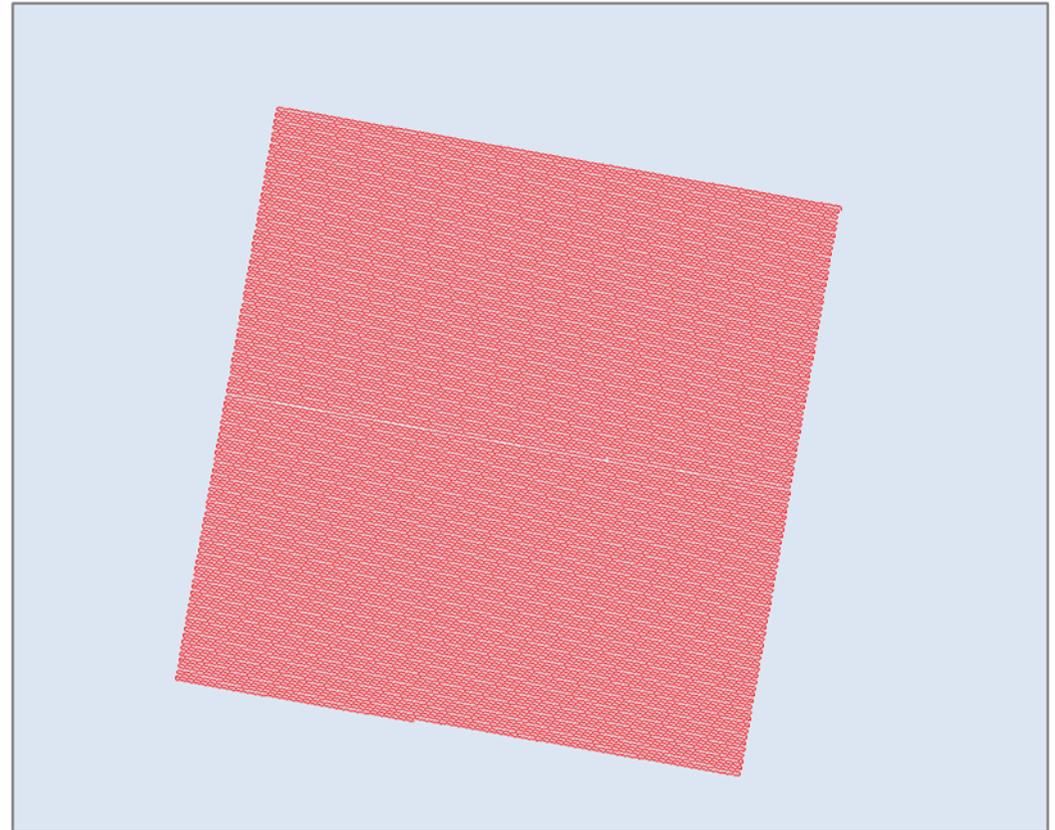


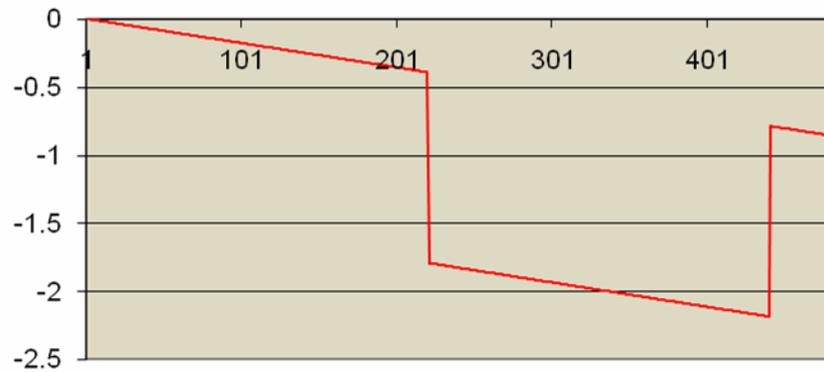
The Angle (radian) of the direction progressive micro displacement of the micro aggregate of the solid and fluid micro particles (being considered, as one integer) relatively of number of node point, in which micro depression have spreads.

The Image of quadrate, created by the spreading of micro depression in the mobile model of layer of environment.

$$(\lambda=0; \gamma'_i=0; N_{zm}=6,4 \cdot 10^{12}; \\ \zeta=2 \cdot 10^{10}; A=90; \gamma''_i=0)$$

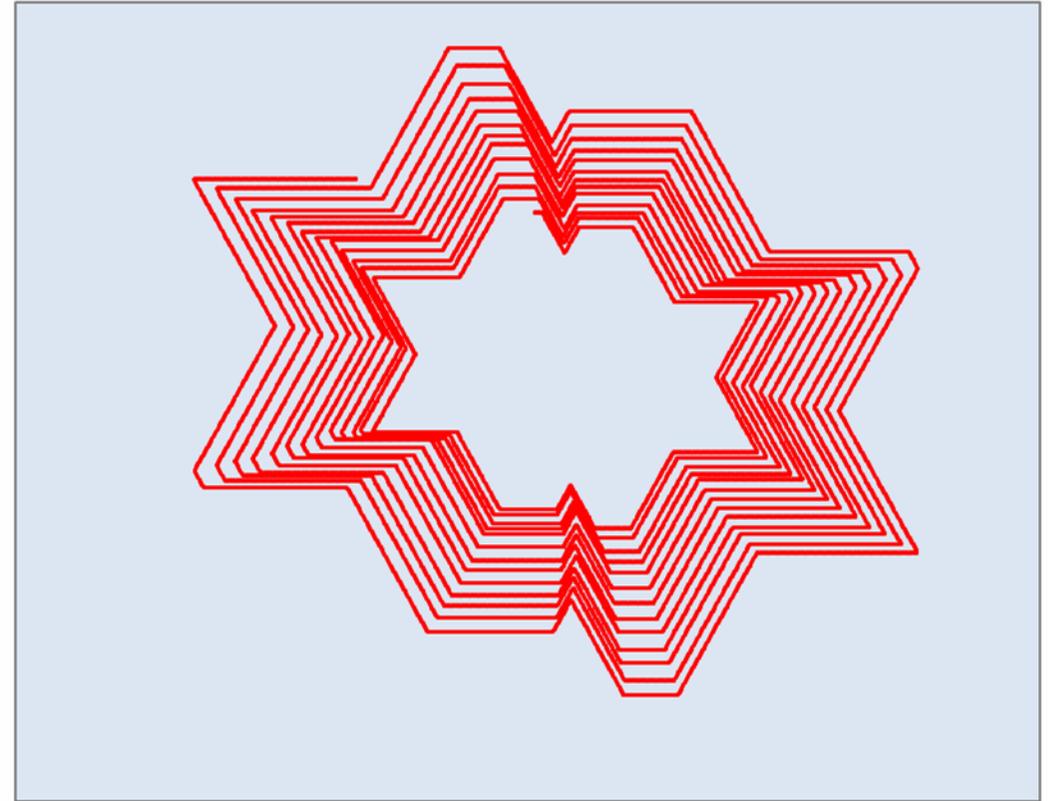
Fig.28





The Angle (radian) of the direction progressive micro displacement of the micro aggregate of the solid and fluid micro particles (being considered, as one integer) relatively of number of node point , in which micro depression have spreads .

Fig.29



The Image, created by the spreading of micro depression in the mobile model of layer of environment.

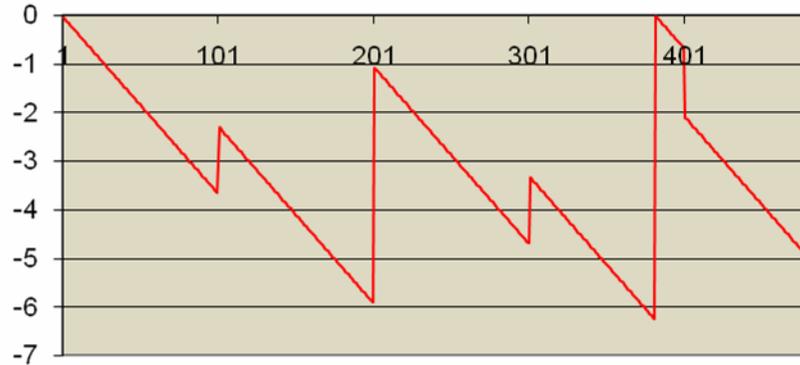
$$(\chi=0; \gamma'_i=0,102; N_{zm}=6,6 \cdot 10^4; \zeta=3,0 \cdot 10^2; A=40; \gamma''_i=0)$$

THE PATTERNS OF "CROP CIRCLES" ARE CREATING BY MICRO PHYSICAL PHENOMENA

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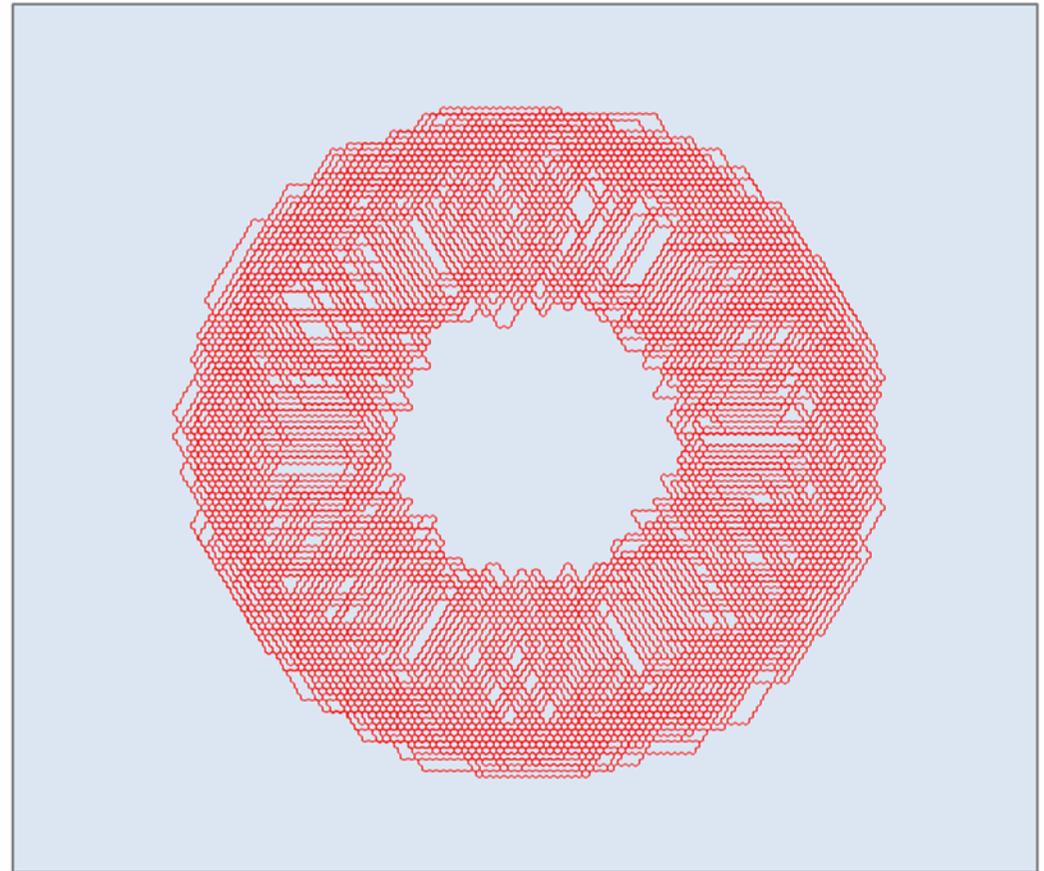


The Angle (radian) of the direction progressive micro displacement of the micro aggregate of the solid and fluid micro particles (being considered, as one integer) relatively of number of node point, in which micro depression have spreads.

The Image of ring, created by the spreading of micro depression in the mobile model of layer of environment.

$$(\lambda=0; \gamma'_i=2,0955; N_{zm}=6,0 \cdot 10^{12}; \\ \zeta=6 \cdot 10^{10}; A=140; \gamma''_i=0)$$

Fig.30



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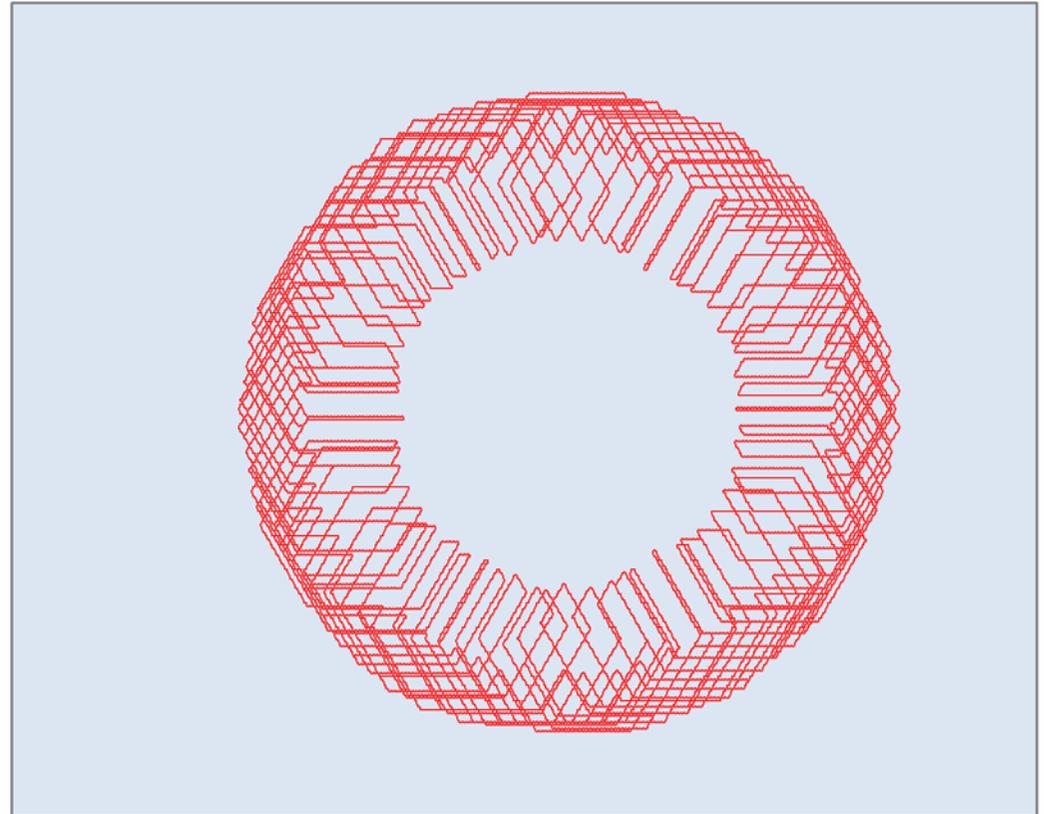


The Angle (radian) of the direction progressive micro displacement of the micro aggregate of the solid and fluid micro particles (being considered, as one integer) relatively of number of node point, in which micro depression have spreads.

The Image of ring, created by the spreading of micro depression in the mobile model of layer of environment.

$$(\lambda=0; \gamma'_i=1,095; N_{zm}=6,0 \cdot 10^{12}; \\ \zeta=3 \cdot 10^{10}; A=-60; \gamma''_i=0)$$

Fig.31

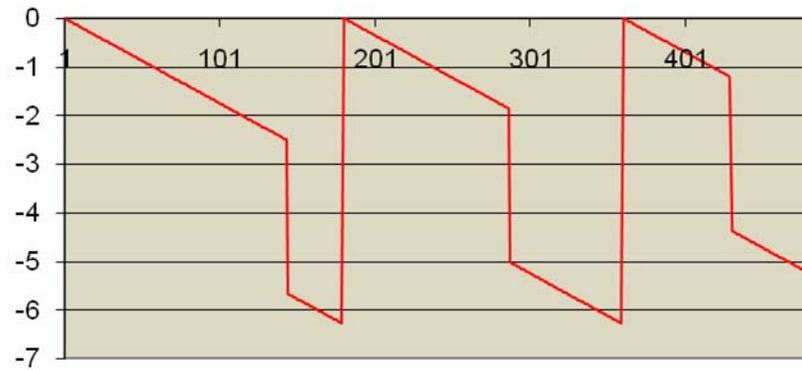


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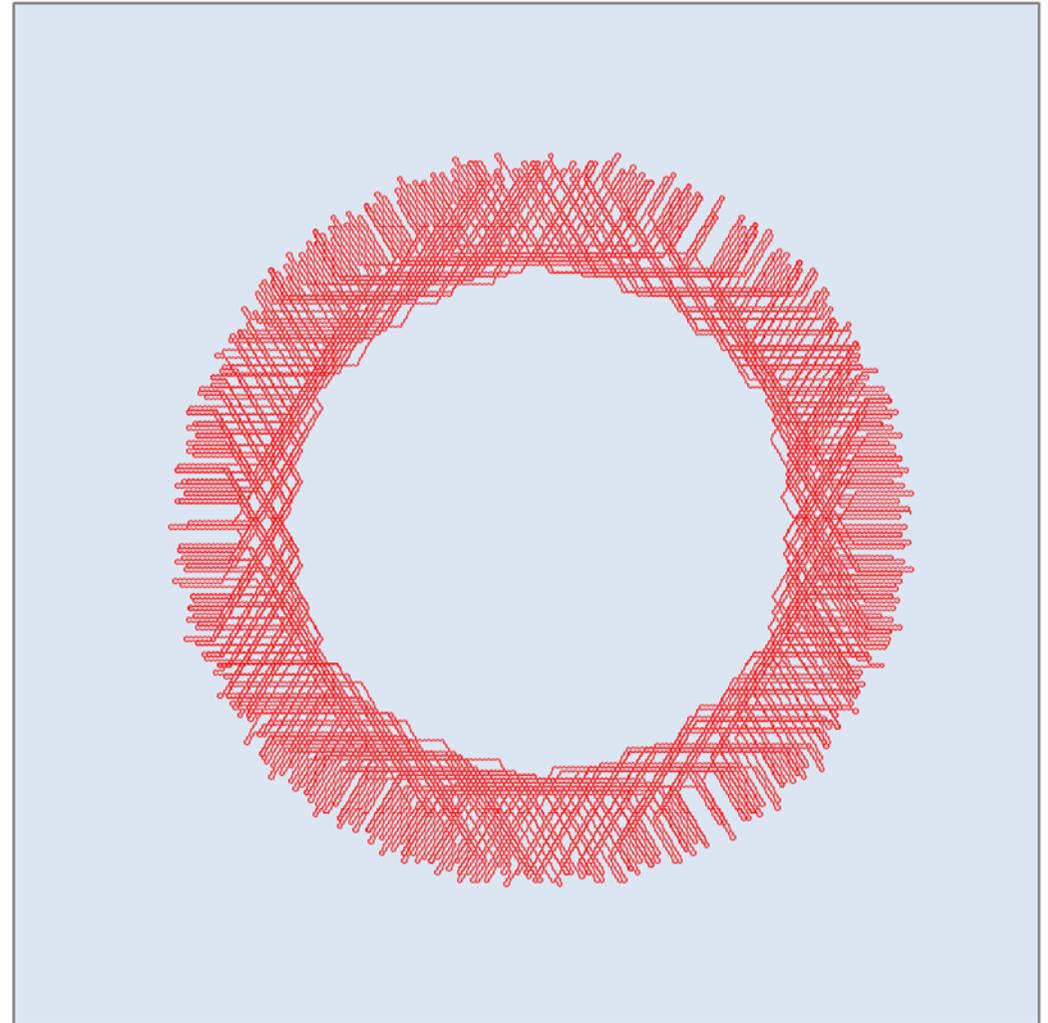
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The Angle (radian) of the direction progressive micro displacement of the micro aggregate of the solid and fluid micro particles (being considered, as one integer) relatively of number of node point, in which micro depression have spreades

The Image of ring, created by the spreading of micro depression in the mobile model of layer of environment.
 $(\lambda=0; \gamma'_i=1,000015; N_{zm}=5,0 \cdot 10^{10};$
 $\zeta=3,5 \cdot 10^8; A=90; \gamma''_i=0)$

Fig.32

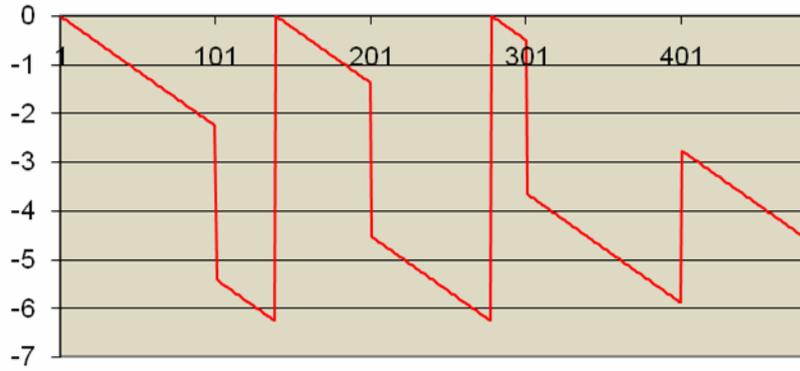


THE PATTERNS OF "CROP CIRCLES" ARE CREATING BY MICRO PHYSICAL PHENOMENA

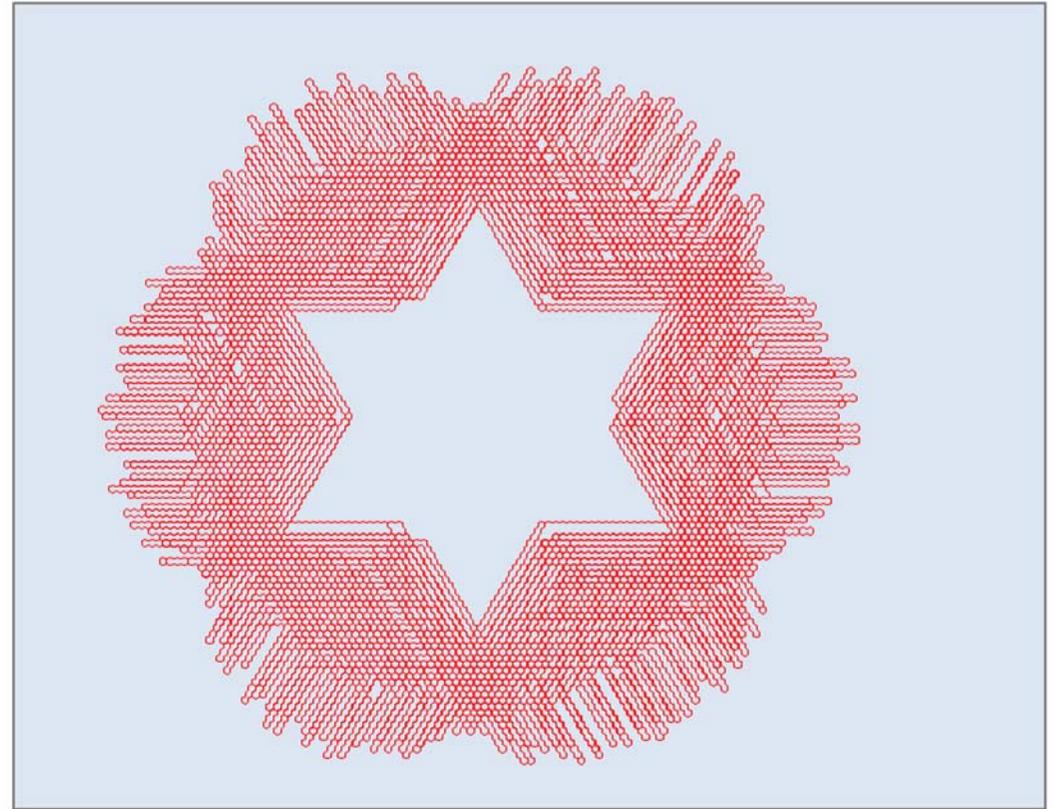
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The Angle (radian) of the direction progressive micro displacement of the micro aggregate of the solid and fluid micro particles (being considered, as one integer) relatively of number of node point, in which micro depression have spreads.



The Image of aureole of star, created by the spreading of micro depression in the mobile model of layer of environment.

$$(\lambda=0; \gamma'_i=1,295; N_{zm}=5,0 \cdot 10^{12}; \zeta=5,0 \cdot 10^{10}; A=90; \gamma''_i=0)$$

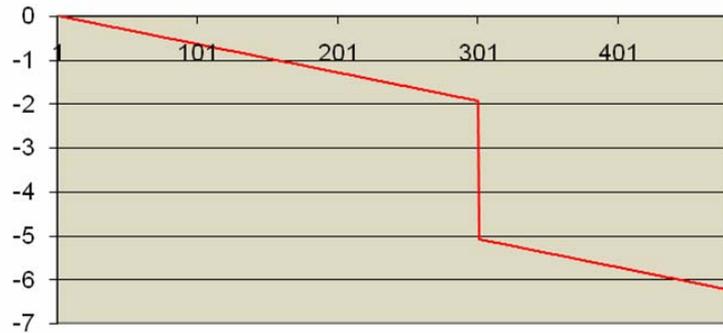
Fig.33

THE PATTERNS OF "CROP CIRCLES" ARE CREATING BY MICRO PHYSICAL PHENOMENA

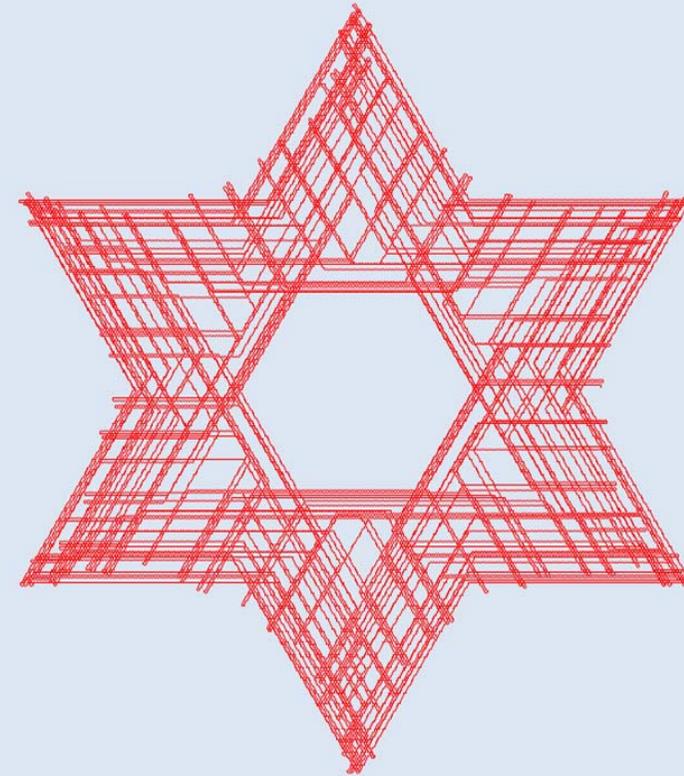
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The Angle (radian) of the direction progressive micro displacement of the micro aggregate of the solid and fluid micro particles (being considered, as one integer) relatively of number of node point, in which micro depression have spreads.



The Image of star, created by the spreading of micro depression in the mobile model of layer of environment.

$$(\lambda=0; \gamma'_i=0,3701; N_{zm}=6,0 \cdot 10^{12}; \zeta=2,0 \cdot 10^{10}; A=90; \gamma''_i=0)$$

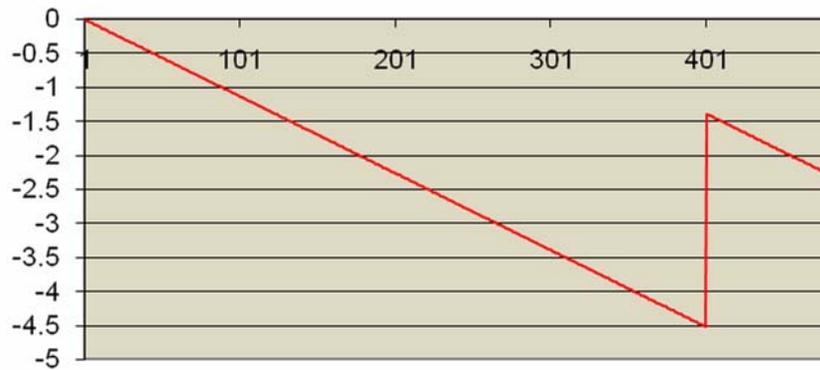
Fig.34

THE PATTERNS OF "CROP CIRCLES" ARE CREATING BY MICRO PHYSICAL PHENOMENA

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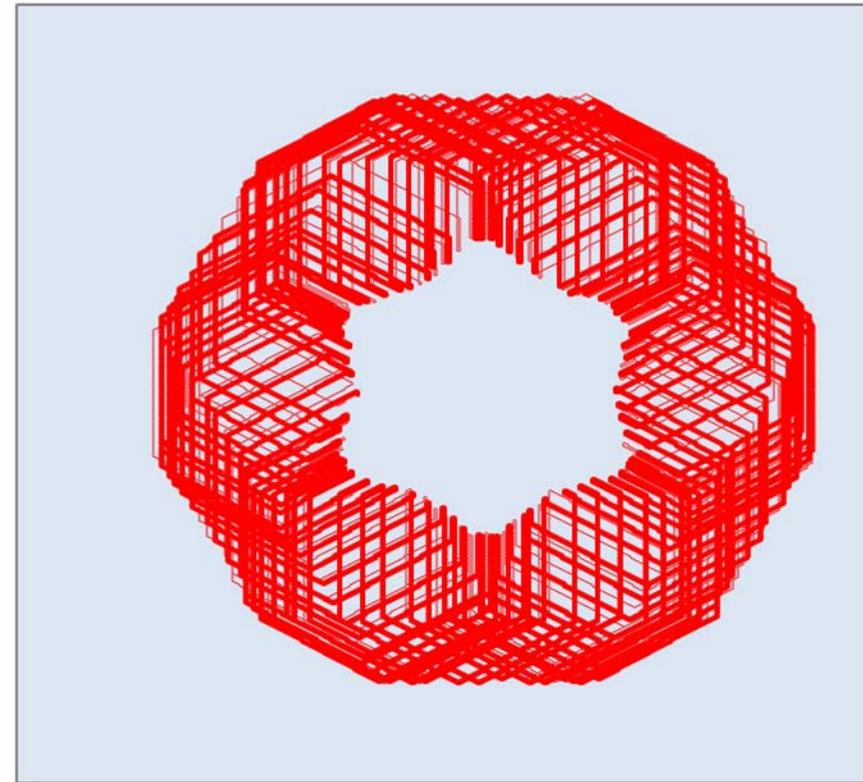
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The Angle (radian) of the direction progressive micro displacement of the micro aggregate of the solid and fluid micro particles (being considered, as one integer) relatively of number of node point, in which micro depression have spreads.

Fig.35



The Image of dodecahedron, created by the spreading of micro depression in the mobile model of layer of environment.

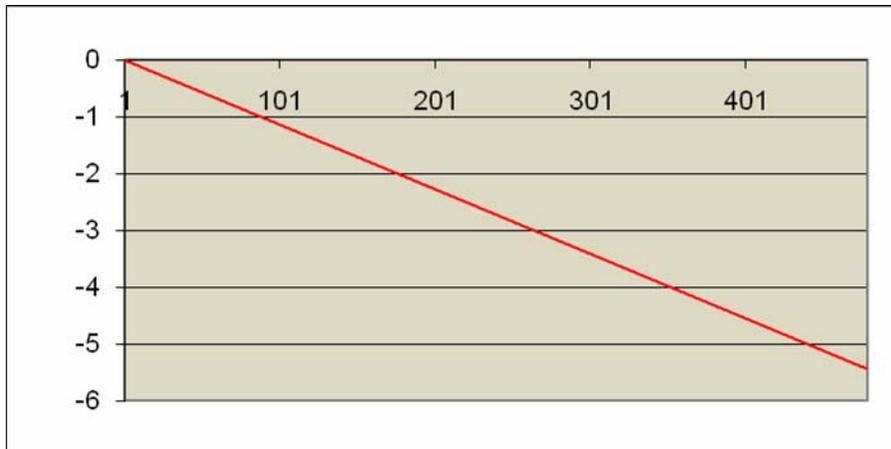
($\lambda = -30$; $\gamma'_i = 0,6487941$; $N_{zm} = 5,0 \cdot 10^{20}$; $\zeta = 1,25 \cdot 10^{18}$; $A = 90$; $\gamma''_i = 0$)

THE PATTERNS OF "CROP CIRCLES" ARE CREATING BY MICRO PHYSICAL PHENOMENA

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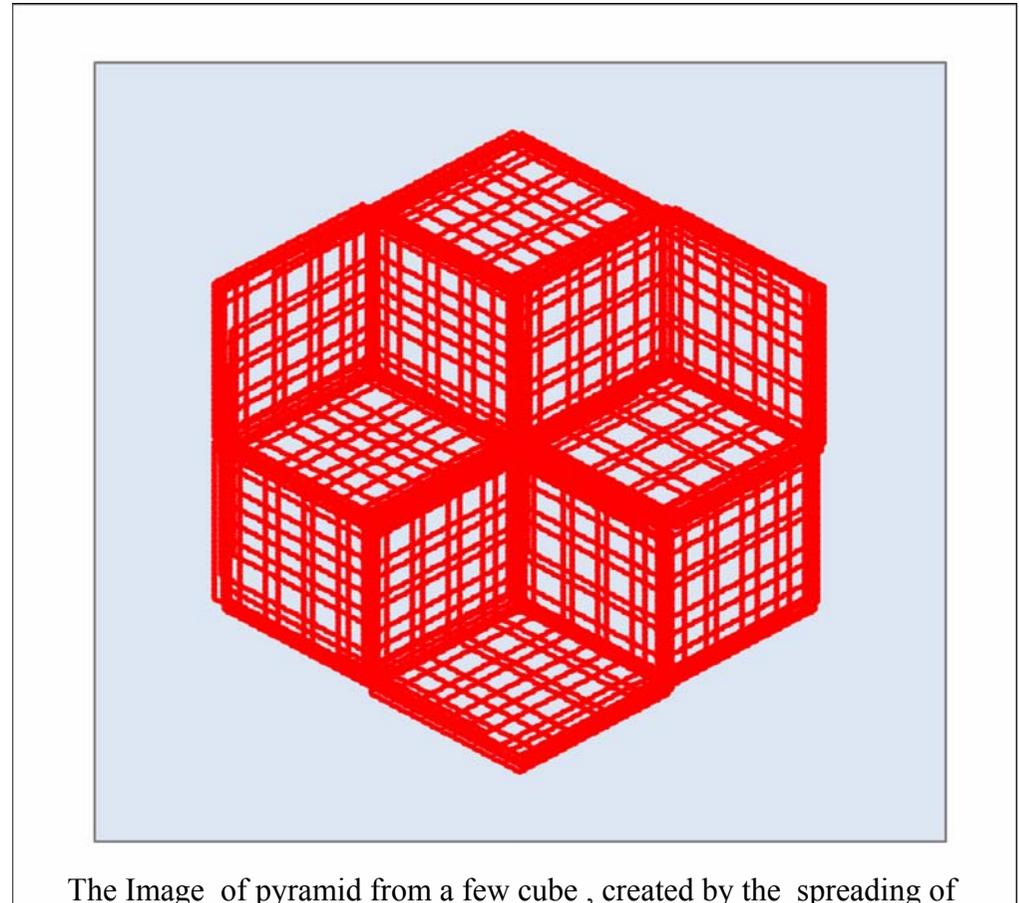
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The Angle (radian) of the direction progressive micro displacement of the micro aggregate of the solid and fluid micro particles (being considered, as one integer) relatively of number of node point, in which micro depression have spreads.

Fig.36



The Image of pyramid from a few cube, created by the spreading of micro depression in the mobile model of layer of environment.

($\lambda = -30$; $\gamma'_i = 0,6505$; $N_{zm} = 6,0 \cdot 10^{12}$; $\zeta = 1,0 \cdot 10^{10}$; $A = 90$; $\gamma''_i = 0$)

THE PATTERNS OF "CROP CIRCLES" ARE CREATING BY MICRO PHYSICAL PHENOMENA

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Conclusion

The Numerical experiment has shown:

1. In layer of the mountain breed the spreading of the overpunch of micro particles creates the varied images, including images of the geometric figures (**Fig.20 - 28, 30-36.**).

For the images, got in the numerical experiment, exists an analogues amongst drawings (fig.) "**Crop Circles**", which was discovered by the watchers in world.

2. Alongside with images of the flat objects, in the numerical experiment are received images (**Fig. 35-36.**), which possible is perceive as drawings (Fig.) of three-dimensional objects.

3. In layer of the mountain breed, whose solid micro structures (skeleton) are staying motionless, direction of the spreading of overpunch are varies by casually in directions from one micro particle towards another micro particle.

4. Micro displacement of the solid micro structures of mountain breed, which is arising as result of micro destruction of mountain breed, normalizes the spreading of a overpunch of the micro particles in the layer of environment.

Ranked spreading of a overpunch in the layer of environment creates the varied images.

5. The images of "**Crop Circles**" are arising by naturally.

For creating the images of "**Crop Circles**" there is no need to attract the artists, militaries or aliens.

6. Regulation of the spreading a overpunch of the micro particles, by way of the micro displacement of the solid micro structures (skeleton) of mountain breed, are realizing to accordance with the physics laws. One of the manifestations of the physics laws comes to light in the mathematically exact proportions, of arising images.

The Mathematical factors, for instance number π for the images of "**Crop Circles**", were repeatedly noted by the researchers.

7. The micro displacement of the solid micro structures (skeleton) of mountain breed is creates by the combination of the tehnogetic and natural sources of the mechanical pressure at the mountain breeds. The increase of amount and power of the tehnogetic sources enlarge the frequency of the appearance, the sizes and the intricacy of the images of "**Crop Circles**".

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Address of cell of worker of the sheet and the formulas in system Microsoft Excel .

The raw data:

$$\mathbf{L12} = N_{zm}$$

$$\mathbf{L13} = \zeta$$

$$\mathbf{D20} = \gamma'_i$$

$$\mathbf{L16} = x_0 \quad (x_0 = 0)$$

$$\mathbf{L17} = y_0 \quad (y_0 = 0)$$

$$\mathbf{J15} = A$$

$$\mathbf{B19} = 2 \cdot \pi$$

$$\mathbf{L18} = D_f \quad (D_f = 0,0001)$$

$$\mathbf{L19} = ((3)^{1/2})/(2)$$

$$\mathbf{E18} = \gamma''_i$$

$$\mathbf{U20} = 1$$

$$\mathbf{N13} = \alpha \quad (\alpha = 210)$$

$$\mathbf{N14} = \beta \quad (\beta = 90)$$

$$\mathbf{N16} = \varphi \quad (\varphi = 330)$$

$$\mathbf{L14}$$

$$\mathbf{G12} = \text{IF}(\text{COS}(\text{RADIANS}(\text{\$N\$14})) < (0.0000000000000001); 0; \text{COS}(\text{RADIANS}(\text{\$N\$14})))$$

$$\mathbf{G13} = \text{SIN}(\text{RADIANS}(\text{\$N\$14}))$$

$$\mathbf{G14} = \text{COS}(\text{RADIANS}(\text{\$N\$13}))$$

$$\mathbf{G15} = \text{SIN}(\text{RADIANS}(\text{\$N\$13}))$$

$$\mathbf{G16} = \text{COS}(\text{RADIANS}(\text{\$N\$16}))$$

$$\mathbf{G17} = \text{SIN}(\text{RADIANS}(\text{\$N\$16}))$$

$AQ21 = \begin{cases} 1 - \text{when the solid micro particles be displaced as uniform micro structure} \\ 0 - \text{when the solid micro particles not be displaced} \end{cases}$
 $L20 = \begin{cases} 1 \\ 0 \end{cases}$

$AJ21 = 2$

$AK21 = 1$

$AL21 = 3$

$P20 = 2$

$Q20 = 1$

$R20 = 3$

$V21 = 2$

$W20 = 2$

$Y21 = 1$

$Z20 = 1$

$AB21 = 3$

$AC20 = 3$

$AE21 = 2$

$AF21 = 1$

$AG21 = 3$

$AN21 = 2$

$AO21 = 1$

$AP21 = 3$

$L11 = N_h^* \quad (N_h^* = N_{zm}/2)$

$BB22 = \lambda$

Sought data:

S24 ; S25; ... S65536. (x - coordinates of node points, through which were spreaded the micro depressions)

T24 ; T25; ... T65536. (y - coordinates of node points, through which were spreaded the micro depressions)

ALGORITHM:

A23 =MOD(ABS(\$B23);\$B\$19)*SIGN(\$B23)

B23 =(RADIANS(-\$C23-\$J\$15*(1-(POWER(-1;\$K23))))))

C23 =\$D23+E23

D23 =-\$E\$18*(1-(POWER(-1;\$K23+1)))

E23 =\$D\$20/(POWER((1-1/\$L\$13);\$K23))

F23 =IF(\$L23>INT(\$L23);INT(\$L23)+1;INT(\$L23))

G23 =POWER(-1;\$H23)

H23 =\$I23+\$L\$20

I23 =1

J23= IF(\$L\$12-\$I23-\$L\$11>0;1;0)

K23 =0

L23 =((POWER((1-1/\$L\$13);\$K23))*(\$L\$12/\$L\$13))

M23 =IF(\$F23>0;1;0)

N23 =IF(\$F23-\$M23<1;0;\$F23-\$M23)

O23

P23 =IF(ABS(SIN(RADIANS(-\$C23+\$N\$13-\$J\$15*(1-(POWER(-1;\$K23)))-90*(-1+(POWER(-1;\$I23))))))<0.0000001;0;(SIN(RADIANS(-\$C23+\$N\$13-\$J\$15*(1-(POWER(-1;\$K23)))-90*(-1+(POWER(-1;\$I23))))))

Q23 =IF(ABS(SIN(RADIANS(-\$C23+\$N\$14-\$J\$15*(1-(POWER(-1;\$K23)))-90*(-1+(POWER(-1;\$I23))))))<0.0000001;0;(SIN(RADIANS(-\$C23+\$N\$14-\$J\$15*(1-(POWER(-1;\$K23)))-90*(-1+(POWER(-1;\$I23))))))

R23 =IF(ABS(SIN(RADIANS(-\$C23+\$N\$16-\$J\$15*(1-(POWER(-1;\$K23)))-90*(-1+(POWER(-1;\$I23))))))<0.0000001;0;(SIN(RADIANS(-\$C23+\$N\$16-\$J\$15*(1-(POWER(-1;\$K23)))-90*(-1+(POWER(-1;\$I23))))))

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23.03.2009

S23 = \$L\$16

T23 = \$L\$17

U23 = \$U\$20

V23 = \$S23+\$G\$14*\$L\$18*\$G23

W23 = \$T23+\$G\$15*\$L\$18*\$G23

X23

Y23 = \$S23+(\$G\$12)*\$L\$18*\$G23

Z23 = \$T23+(\$G\$13)*(\$L\$18)*\$G23

AA23

AB23 = \$S23+(\$G\$16)*(\$L\$18)*\$G23

AC23 = \$T23+(\$G\$17)*(\$L\$18)*\$G23

AD23

AE23 = SIGN((\$W23-\$T23))

AF23 = SIGN((\$Z23-\$T23))

AG23 = SIGN((\$AC23-\$T23))

AH23 = IF((\$AJ\$21-\$AJ23)+(\$AK\$21-\$AK23)+(\$AL\$21-\$AL23)=1;3;IF((\$AJ\$21-\$AJ23)+(\$AK\$21-\$AK23)+(\$AL\$21-\$AL23)=2;1;2))

AI23 = IF((\$AJ\$21-\$AJ23)+(\$AK\$21-\$AK23)+(\$AL\$21-\$AL23)=1;2;IF((\$AJ\$21-\$AJ23)+(\$AK\$21-\$AK23)+(\$AL\$21-\$AL23)=2;3;1))

AJ23 = IF(\$AJ\$21=\$U23;0;\$AJ\$21)

AK23 = IF(\$AK\$21=\$U23;0;\$AK\$21)

AL23 = IF(\$AL\$21=\$U23;0;\$AL\$21)

AM23

AN23 = IF(\$AJ23=\$AJ\$21;0;(SIGN(\$P23)))*(1-POWER((-1);\$AQ\$21))/2

AO23 = IF(\$AK23=\$AK\$21;0;(SIGN(\$Q23)))*(1-POWER((-1);\$AQ\$21))/2

AP23 = IF(\$AL23=\$AL\$21;0;(SIGN(\$R23)))*(1-POWER((-1);\$AQ\$21))/2

AQ23 = IF(RAND()>0.5;1;0)

AR23

AS23

AT23

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AU23 =(1-SUM(\$AN23:\$AP23)*SUM(\$AN23:\$AP23))*(IF(\$AJ\$21=\$U23;(\$AK23*\$AQ23-\$AL23*(1-\$AQ23));
(\$AJ\$21*\$AQ23+(\$AK23+\$AL23)*(1-\$AQ23))) +SUM(\$AN23:\$AP23)*SUM(\$AN23:\$AP23)*(IF(SUM(\$AN23:\$AP23)<0;\$AH23;\$AI23))

A24 =MOD(ABS(\$B24);\$B\$19)*SIGN(\$B24)

B24 =(RADIANS(-\$C24-\$J\$15*(1-(POWER(-1;\$K24))))))

C24 =\$D24+E24

D24 = -\$E\$18*(1-(POWER(-1;\$K24+1)))

E24 =\$E23+\$D\$20/(POWER((1-1/\$L\$13);\$K24))

F24 =IF(\$L24>INT(\$L24);INT(\$L24)+1;INT(\$L24))

G24 =POWER(-1;\$H24)

H24 =\$I24+\$L\$20

I24 =\$I23+1

J24= IF(\$L\$12-\$I24-\$L\$11>0;1;0)

K24 =IF(\$N23=0;\$K23+1;\$K23)

L24 =((POWER((1-1/\$L\$13);\$K24))) * (\$L\$12/\$L\$13))

M24 =IF(\$N23=0;1;\$M23+1)

N24 =IF(\$F24-\$M24<1;0;\$F24-\$M24)

O24

P24 =IF(ABS(SIN(RADIANS(-\$C24+\$N\$13-\$J\$15*(1-(POWER(-1;\$K24))))-90*(-1+(POWER(-1;\$I24))))))<0.00000001;0;(SIN(RADIANS(-
\$C24+\$N\$13-\$J\$15*(1-(POWER(-1;\$K24))))-90*(-1+(POWER(-1;\$I24))))))

Q24 =IF(ABS(SIN(RADIANS(-\$C24+\$N\$14-\$J\$15*(1-(POWER(-1;\$K24))))-90*(-1+(POWER(-1;\$I24))))))<0.00000001;0;(SIN(RADIANS(-
\$C24+\$N\$14-\$J\$15*(1-(POWER(-1;\$K24))))-90*(-1+(POWER(-1;\$I24))))))

R24 =IF(ABS(SIN(RADIANS(-\$C24+\$N\$16-\$J\$15*(1-(POWER(-1;\$K24))))-90*(-1+(POWER(-1;\$I24))))))<0.00000001;0;(SIN(RADIANS(-
\$C24+\$N\$16-\$J\$15*(1-(POWER(-1;\$K24))))-90*(-1+(POWER(-1;\$I24))))))

S24 =IF(U23=3;\$AB23;IF(U23=2;\$V23;\$Y23))* \$J24 +\$T23*(1-\$J24)

T24 =IF(U23=3;\$AC23;IF(U23=2;\$W23;\$Z23))* \$J24 +\$T23*(1-\$J24)

U24 =\$AU23

V24 =\$S24+\$G\$14*\$L\$18*\$G24

W24 =\$T24+\$G\$15*\$L\$18*\$G24

X24

Y24 =\$S24+(\$G\$12)*\$L\$18*\$G24

Z24 =\$T24+(\$G\$13)*(\$L\$18)*\$G24

AA24

AB24 =\$S24+(\$G\$16)*(\$L\$18)*\$G24

AC24 =\$T24+(\$G\$17)*(\$L\$18)*\$G24

AD24

AE24 =SIGN((\$W24-\$T24))

AF24 =SIGN((\$Z24-\$T24))

AG24 =SIGN((\$AC24-\$T24))

AH24 =IF((\$AJ\$21-\$AJ24)+(\$AK\$21-\$AK24)+(\$AL\$21-\$AL24)=1;3;IF((\$AJ\$21-\$AJ24)+(\$AK\$21-\$AK24)+(\$AL\$21-\$AL24)=2;1;2))

AI24 =IF((\$AJ\$21-\$AJ24)+(\$AK\$21-\$AK24)+(\$AL\$21-\$AL24)=1;2;IF((\$AJ\$21-\$AJ24)+(\$AK\$21-\$AK24)+(\$AL\$21-\$AL24)=2;3;1))

AJ24 =IF(\$AJ\$21=\$U24;0;\$AJ\$21)

AK24 =IF(\$AK\$21=\$U24;0;\$AK\$21)

AL24 =IF(\$AL\$21=\$U24;0;\$AL\$21)

AM24

AN24 =IF(\$AJ24=\$AJ\$21;0;(SIGN(\$P24)))

AO24 =IF(\$AK24=\$AK\$21;0;(SIGN(\$Q24)))

AP24 =IF(\$AL24=\$AL\$21;0;(SIGN(\$R24)))

AQ24 =IF(RAND(>0.5;1;0)

AR24

AS24

AT24

AU24 =(1-SUM(\$AN24:\$AP24)*SUM(\$AN24:\$AP24))*(IF(\$AJ\$21=\$U24;(\$AK24*\$AQ24-\$AL24*(1-\$AQ24));(\$AJ\$21*\$AQ24+(\$AK24+\$AL24)*(1-\$AQ24))))

+SUM(\$AN24:\$AP24)*SUM(\$AN24:\$AP24)*(IF(SUM(\$AN24:\$AP24)<0;\$AH24;\$AI24))

A25 =MOD(ABS(\$B25);\$B\$19)*SIGN(\$B25)
B25 =(RADIANS(-\$C25-\$J\$15*(1-(POWER(-1;\$K25))))))
C25 =\$D25+E25
D25 =-\$E\$18*(1-(POWER(-1;\$K25+1)))
E25 =\$E24+\$D\$20/(POWER((1-1/\$L\$13);\$K25))
F25 =IF(\$L25>INT(\$L25);INT(\$L25)+1;INT(\$L25))
G25 =POWER(-1;\$H25)
H25 =\$I25+\$L\$20
I25 =\$I24+1
J25 = IF(\$L\$12-\$I25-\$L\$11>0;1;0)
K25 =IF(\$N24=0;\$K24+1;\$K24)
L25 =((POWER((1-1/\$L\$13);\$K25))) * (\$L\$12/\$L\$13)
M25 =IF(\$N24=0;1;\$M24+1)
N25 =IF(\$F25-\$M25<1;0;\$F25-\$M25)
O25
P25 =IF(ABS(SIN(RADIANS(-\$C25+\$N\$13-\$J\$15*(1-(POWER(-1;\$K25)))-90*(-1+(POWER(-1;\$I25))))))<0.00000001;0;(SIN(RADIANS(-
 \$C25+\$N\$13-\$J\$15*(1-(POWER(-1;\$K25)))-90*(-1+(POWER(-1;\$I25))))))
Q25 =IF(ABS(SIN(RADIANS(-\$C25+\$N\$14-\$J\$15*(1-(POWER(-1;\$K25)))-90*(-1+(POWER(-1;\$I25))))))<0.00000001;0;(SIN(RADIANS(-
 \$C25+\$N\$14-\$J\$15*(1-(POWER(-1;\$K25)))-90*(-1+(POWER(-1;\$I25))))))
R25 =IF(ABS(SIN(RADIANS(-\$C25+\$N\$16-\$J\$15*(1-(POWER(-1;\$K25)))-90*(-1+(POWER(-1;\$I25))))))<0.00000001;0;(SIN(RADIANS(-
 \$C25+\$N\$16-\$J\$15*(1-(POWER(-1;\$K25)))-90*(-1+(POWER(-1;\$I25))))))
S25 =IF(U24=3;\$AB24;IF(U24=2;\$V24;\$Y24)) * \$J25 +\$S24*(1-\$J25)
T25 =IF(U24=3;\$AC24;IF(U24=2;\$W24;\$Z24)) * \$J25 +\$T24*(1-\$J25)
U25 =\$AU24
V25 =\$S25+\$G\$14*\$L\$18*\$G25
W25 =\$T25+\$G\$15*\$L\$18*\$G25
X25
Y25 =\$S25+(\$G\$12)*\$L\$18*\$G25
Z25 =\$T25+(\$G\$13)*\$L\$18*\$G25

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AA25**AB25** = \$S25 + (\$G\$16) * (\$L\$18) * \$G25**AC25** = \$T25 + (\$G\$17) * (\$L\$18) * \$G25**AD25****AE25** = SIGN((\$W25-\$T25))**AF25** = SIGN((\$Z25-\$T25))**AG25** = SIGN((\$AC25-\$T25))**AH25** = IF((\$AJ\$21-\$AJ25)+(\$AK\$21-\$AK25)+(\$AL\$21-\$AL25)=1;3;IF((\$AJ\$21-\$AJ25)+(\$AK\$21-\$AK25)+(\$AL\$21-\$AL25)=2;1;2))**AI25** = IF((\$AJ\$21-\$AJ25)+(\$AK\$21-\$AK25)+(\$AL\$21-\$AL25)=1;2;IF((\$AJ\$21-\$AJ25)+(\$AK\$21-\$AK25)+(\$AL\$21-\$AL25)=2;3;1))**AJ25** = IF(\$AJ\$21=\$U25;0;\$AJ\$21)**AK25** = IF(\$AK\$21=\$U25;0;\$AK\$21)**AL25** = IF(\$AL\$21=\$U25;0;\$AL\$21)**AM25****AN25** = IF(\$AJ25=\$AJ\$21;0;(SIGN(\$P25)))**AO25** = IF(\$AK25=\$AK\$21;0;(SIGN(\$Q25)))**AP25** = IF(\$AL25=\$AL\$21;0;(SIGN(\$R25)))**AQ25** = IF(RAND()>0.5;1;0)**AR25****AS25****AT25**

AU25 = (1-SUM(\$AN25:\$AP25)*SUM(\$AN25:\$AP25))*(IF(\$AJ\$21=\$U25;(\$AK25*\$AQ25-\$AL25*(1-\$AQ25));(\$AJ\$21*\$AQ25+(\$AK25+\$AL25)*(1-\$AQ25))))
 +SUM(\$AN25:\$AP25)*SUM(\$AN25:\$AP25)*(IF(SUM(\$AN25:\$AP25)<0;\$AH25;\$AI25))

.....

AU65636 = (1-SUM(\$AN65536:\$AP65536)*SUM(\$AN65536:\$AP65536))*(IF(\$AJ\$21=\$U65536;(\$AK65536*\$AQ65536-\$AL65536*(1-\$AQ65536));(\$AJ\$21*\$AQ65536+(\$AK65536+\$AL65536)*(1-\$AQ65536))))
 +SUM(\$AN65536:\$AP65536)*SUM(\$AN65536:\$AP65536)*(IF(SUM(\$AN65536:\$AP65536)<0;\$AH65536;\$AI65536))

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Any questions of this publication must be resolving according to original.