molecular weight compounds and colloidal solutions of the same concentration (A.S. Turaev et al., 2008; I.E. Stas' et al., 2015; Zobov K.V., 2017). The problem remains to study the rheological, structural and mechanical properties of polymers aqueous solutions in the presence of metal and semiconductor nanoparticles, since it is the rheological properties that are most sensitive to changes in the molecular structure of polymer matrices and their complexes. It is characteristic of nanoscale objects that due to their special interaction with the medium, even small additives of nanoparticles to the composite, can significantly improve its mechanical properties, such as strength, adhesion, hardness, fluidity and viscosity, in particular, it is shown that the increase concentration and reduction of particle size leads to an increase in the viscosity of the polymer-colloidal solution. It is established that nanopowders of silicon dioxide of different sizes dramatically affect the viscosity of liquids (Zobov KV, 2017).

The primary task in the aspect of composite materials is to analyze the mechanisms of influence of nanoparticles on the physicochemical parameters of polymer-colloidal solutions in order to identify the factors that differentiate the types of nanopowders.

Ivanchuk M.A.

SEPARATING OF TWO NORMAL DISTRIBUTED RANDOM VARIABLES BY USING THEIR STREWNFIELD

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We consider two sets A and B in two-dimensional Euclidian space R^2, which are generated by normal distributed random variables ξ,η with parameters μ_ξ,Σ_ξ and μ_η,Σ_η accordingly. The ε-separation problem is the problem of finding the line which separates space R^2 into subspacesH^+ and H^- such as $P\{\xi\in H^+\}+P\{\eta\in H^-\}<\varepsilon$.

Suppose $\varepsilon_\xi n_A + \varepsilon_\eta n_B \le \varepsilon\ (n_A+n_B)$. Then ε-separation problem is considered as the problem of finding the line, which separates space R^2 into subspacesH^+ and H^- such as $P\{\xi\in H^+\}<\varepsilon_\xi$ and$P\{\eta\in H^-\}<\varepsilon_\eta$.

If sets A and B are equivalent, one can take $\varepsilon_\xi=\varepsilon_\eta=1/2\varepsilon$. In the case of medical forecasting, if it is necessary to separate the set of patients with the presence of pathology (set A) and without it (set B), in order to maximize the sensitivity of the test, the ε_ξ should be minimized, and if necessary to increase the specifity of the test, the ε_η should be minimized.

We construct the strewn field $B_{\varepsilon\xi}$ of the probability $1\text{-}\varepsilon_\xi$ for the random variable ξ. The probability of a random variable being outside this strewn field is equal to εξ. Similarly, we construct the strewn field B(εη) for a random variable η. Then, if the strewn fields B (εξ) and B (εη) are separable, the sets A and B are ε-separable, and the separating line for the strewn fields B (εξ) and B (εη) is ε-separable for the sets A and B.

So, the problem of ε-separability of two sets, which are generated by the normal-distributed random variables can be reduced to the task of separability of this random variables' strewn fields.

Makhrova Ye.G.

DEVICES FOR SURGICAL TREATMENT OF FRACTURES AND DAMAGES OF LONG BONES

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In operative treatment of fractures and damages of long bones bone-surface osteosynthesis is widely used, as the cheapest, accessible type of osteosynthesis. The use of this type of osteosynthesis is associated with a number of problems that arise in the further use of the fixator.

Existing bone-surface device structures, as a rule, are, in most cases, single-leafed. They unsatisfactorily resist bending deformations of the frontal plane, as well as – deformations of torsion. In addition, such sketch structures should be quite massive, as they should provide a sufficiently high strength of the established bio-system "bone-fixator". Accordingly this, increases their mass and weight.

To eliminate these disadvantages and their negative impact on the quality of osteosynthesis, various sketch structures are used that create bending resistance both in sagittal and frontal planes, and also capable of resisting well with torsional deformations.

To install existing sketch structures, it is necessary to drill openings through the cortical material of the bone, cut in the holes of the thread, to introduce screws to create a static or compression variant of osteosynthesis. All these stages of the operation involve certain medical and technical difficulties. In addition, in the nasal plate, to create a reliable and stable fixation of the chips, it is necessary to drill at least 4 to 6 holes on each side of the fracture line, to hold fixing screws through them, but, as you know, a large number of openings in the cortical substance of the bone causes it enough significant relaxation, which adversely affects the strength and rigidity of the created bone-fixative biotechnology system. In addition, the character of the fracture (multiscope, screw, etc.) does not always allow the necessary number of fixing screws to be made, which makes it impossible to establish a stable, reliable fixing of the broken bones of the broken bone.

The purpose of scientific research was to improve the device for osteosynthesis by reducing the mass of the plate, reducing its area of contact with the surface of the bone and increasing the stiffness: the execution of it from a thin metal sheet, the lateral areas of which are S-shaped curved, on which the wire cerclage is attached to the notch.

The figure shows the construction of a low-contact plate with increased rigidity and reduced weight with lateral lobes for osteosynthesis with the help of wire cerclage (a captive clamp), consisting of a plate 1, on the lateral edges of which there are wavy projections and depressions – notches 2, notch is clearly kept wire cerclage 3 on the level necessary for reliable and effective fixation on the surface of the broken bone 4.

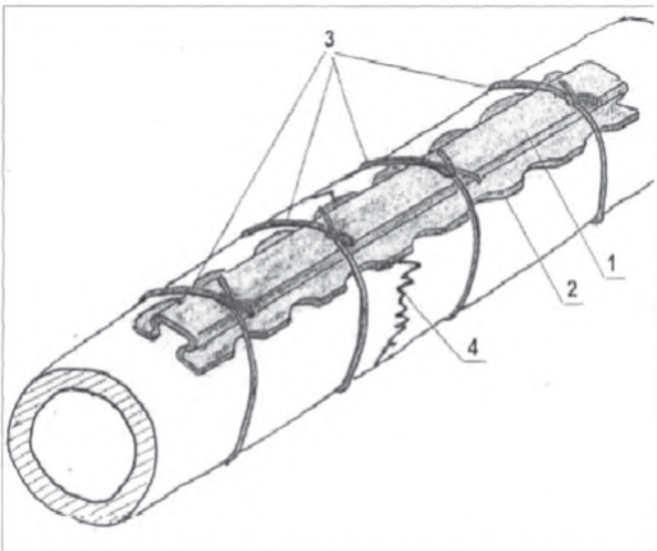

Fig. Low-contact plate for osteosynthesis

The two S-shaped side sections of the proposed plate increase its stiffness in the sagittal and frontal planes, as well as in the twisting.

The two longitudinal parallel supporting surfaces may, to some extent, be detached so that they are better pressed against the outer surface of the bone, depending on its diameter.