ISSN 2056-5852

THE IMPORTANCE OF MULTIPLAYER GAMES IN THE DEVELOPMENT OF CREATIVE COMPETENCE AMONG STUDENTS

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ABSTRACT

In the article a method of solving tasks for multiplayer pursuit-evasion games is given. This task belongs to case when pursuers are not encircled the evader. It is shown that in this case the evader can to escape, especially if he will run to the open side.

Keywords: Problem-based learning, problematic mathematical problems, corrective solution.

INTRODUCTION, LITERATURE REVIEW AND DISCUSSION

In the context of radical reforms in education, the form and content of education have changed. It is also time-consuming to develop methods for developing creative competence in the teaching process. A distinctive feature of students' creative competence is that they develop like other competencies. Therefore, the main task of the teacher in solving this problem is to find the forms, methods and means of organizing students' creative activity in the process of teaching mathematics.

As you know, the solution of the problem is to apply the theoretical knowledge gained in practice. This is important for developing students' mathematical thinking, including analyzing events, summarizing information about them, identifying similarities and differences. Through problem solving, students broaden their knowledge, gain a deeper knowledge of laws and formulas, consider the limits of their application, and gain the skills to apply common laws to specific situations. Problem solving forms mental activities, specific approaches to mathematical phenomena. Students will learn to take a broad range of processes to address a particular topic.

New situations that are not known for solving problems are the process of acquiring new knowledge by identifying problematic issues. Managing learning in the learning process is primarily about managing the process of discovering innovation through problem-solving. The discovery process can be conditionally divided into two stages. In the first step, a student solves the problem with the help of a teacher, books, or other means. During the second phase of the analysis of the problem, the student will have an urgent need to invent something new and solve new problems. This is, of course, a very unique and highly complex psychological process in man. The success of the teacher is also what motivates the student.

A great deal of psychological and pedagogical research has been devoted to the study of these cases, for example the works of N.A.Mencinsky, D.N.Bogoyavlensky, V.I.Zikova, E.N.Kobanova-Meller, Z.I.Kalmikova.

It is worth noting that problem-solving in problem situations does not come with the solution process. Correcting the problem is the psychological state of the student following the problem-solving process. It is a set of questions that arise at the beginning of a student's problem-solving

ISSN 2056-5852

process, and in the process of finding answers to these questions, he or she has discovered some unknown connections between them. As the student solves this new issue, new questions arise, and so on. This condition can be called the main nerve fiber of thinking.

As for the problem-solving process, it is the process of acquiring new knowledge. Only the student works on it. The motivating factor for the student is the desire to discover the awakening in it.
The following key points can be highlighted when addressing potential problems.

1. Complete a new problem. Apply the method that the student learned to solve the initial problem;
2. Solve the problem of applying a particular method to a new problem because of an incomplete situation. If it is not possible to solve the problem in a certain way, then change it and devise a new method;
3. Apply the solution to the problem and solve it;
4. Verify the correctness of the solution.

Each of the four stages in the creative process, in turn, contains a number of stages. Thus, the solution of the problem ends with the discovery of a new solution, starting with the problem that arises in the solution of a particular problem. As we have seen, this process is at the core of the student's creative competence.

Below we present a method for solving games involving a large number of enthusiasts in developing students' creative competence.
Three points x_1, x_2, x_3, y are in the plane. If for any of i = 1,2,3, at any given moment, $x_i = x$ becomes equal, the game is over. The equations of motion of these points are as follows:

$$\dot{x}_1 = u_1,\ \dot{x}_2 = u_2,\ \dot{x}_3 = u_3;\ \dot{y} = v$$

Here u_1, u_2, u_3, v
$\|u_1\| \le 1,\ \|u_2\| \le 1,\ \|u_3\| \le 1,\ \|v\| \le k\ (\|z\| = \sqrt{(z,z)},\ (z,z) -$ scalar multiplication control parameters that satisfy the condition.Generally, measurable functions, which are defined as $u_1 = u_1(\mathrm{t}),\ u_2 = u_2(\mathrm{t}),\ u_3 = u_3(\mathrm{t}), v = (\mathrm{t})$ and k≥1 is a real number.If the hotspots try to finish the game as quickly as possible with their control options, the escape point will extend the game by using its own control parameter. If we substitute $z_i = y - x_i,\ i = 1,2,3$, the equation for the displacement and escape points will look as follows.

$$\dot{z}_1 = -u_1 + v,\ \dot{z}_2 = -u_2 + v,\ \dot{z}_3 = -u_3 + v,\ \|u_1\| \le 1,\ \|u_2\| \le 1,\ \|u_3\| \le 1,\ \|v\| \le k,$$

$z_i = 0$ the game is over, after switching.

1-Problem: In the game described above, k = 1, for the initial $z_1(0) = z_1^0,\ z_2(0) = z_2^0,\ z_3(0) = z_3^0,\ 0 \in Jntco\{z_1^0, z_2^0, z_3^0\}$ Prove that the game ends in a limited time if necessary. Here $Jntco\,A$ denotes the inner point of the bundle shell A.

Solution: In our first example, $0 \in Jntco\{z_1^0, z_2^0, z_3^0\}$ —the O points of the triangle are the inner points of a triangle with points $0 \in Jntco\{z_1^0, z_2^0, z_3^0\}$. Or, to put it simply, the pursuers surround the fugitive. In the final condition $\lambda_1(z_1^0,v)=\left(\frac{z_1^0}{\|z_1^0\|},v\right)+\sqrt{\left(\frac{z_1^0}{\|z_1^0\|},v\right)^2+1-\|v\|^2}$,

$$\lambda_2(z_2^0,v)=\left(\frac{z_2^0}{\|z_2^0\|},v\right)+\sqrt{\left(\frac{z_2^0}{\|z_2^0\|},v\right)^2+1-\|v\|^2}$$

$$\lambda_3(z_3^0,v)=\left(\frac{z_3^0}{\|z_3^0\|},v\right)+\sqrt{\left(\frac{z_3^0}{\|z_3^0\|},v\right)^2+1-\|v\|^2},\ \lambda_3(z^0)=\min_{\|v\|\le 1} z\left[\lambda_1(z_1^0,v)+\lambda_2(z_2^0,v)+\lambda_3(z_3^0,v)\right]>0$$

prove that.

We take the argument in the opposite way. In fact, let $\lambda(z^0)=0$, other wise $\lambda(z^0)<0$, since $\lambda_1,\lambda_2,\ \lambda_3$ are less than zero therefore, the sum of c must not be less than zero. Thus, let $\lambda(z^0)=0$. Then there is $\lambda(z^0)=0$ where $\lambda_1(z_1^0,v^0)+\lambda_2(z_2^0,v^0)+\lambda_3(z_3^0,v^0)=0$ Hence, $\lambda_1(z_1^0,v^0)=0,\ \lambda_2(z_2^0,v^0)=0,\ \lambda_3(z_3^0,v^0)=0$. appears. Now let us assume that $\lambda_1(z_1^0,v^0)=0$, is $\lambda_1(z_1^0,v^0)=0$. Otherwise

$$\lambda_1(z_1^0,v^0)=\left(\frac{z_1^0}{\|z_1^0\|},v^0\right)+\sqrt{\left(\frac{z_1^0}{\|z_1^0\|},v^0\right)^2+1-\|v^0\|^2}>\left(\frac{z_1^0}{\|z_1^0\|},v^0\right)+\left|\left(\frac{z_1^0}{\|z_1^0\|}\right)\right|\ge 0$$

inequality.Hence, $\|v^0\|=1$. According to this definition,

$\lambda_1(z_1^0,v)=\left(\frac{z_1^0}{\|z_1^0\|},v\right)+\left|\left(\frac{z_1^0}{\|z_1^0\|},v\right)\right|=0,$ which means $\left(\frac{z_1^0}{\|z_1^0\|},v\right)\le 0,$

$\lambda_2(z_2^0,v)=\left(\frac{z_2^0}{\|z_2^0\|},v\right)+\left|\left(\frac{z_2^0}{\|z_2^0\|},v\right)\right|=0,$ and so $\left(\frac{z_2^0}{\|z_2^0\|},v\right)\le 0,$ $\lambda_3(z_3^0,v)=\left(\frac{z_3^0}{\|z_3^0\|},v\right)+\left|\left(\frac{z_3^0}{\|z_3^0\|},v\right)\right|=0,$

so $\left(\frac{z_3^0}{\|z_3^0\|},v\right)\le 0.$

From these inequalities, the part orthogonal to the points $z_1^0,\ z_2^0,\ z_3^0$ is located on one side of a straight line, from which $0\in \mathrm{Jntco}\{z_1^0,z_2^0,z_3^0\}$, which is contrary to the terms of the issue. Thus, we prove that $\lambda(z^0)>0$.

Now against the optional v = v (t) control of the escape point, let the runners set the following controls:

$$u_1(t)=v(t)+\lambda_1(z_1^0,v(t))\frac{z_1^0}{\|z_1^0\|},\quad u_2(t)=v(t)+\lambda_2(z_2^0,v(t))\frac{z_2^0}{\|z_2^0\|},\quad u_3(t)=v(t)+\lambda_3(z_3^0,v(t))\frac{z_3^0}{\|z_3^0\|},$$

$$0\le t\le T,\ T=\frac{\|z_1^0\|+\|z_2^0\|+\|z_3^0\|}{\lambda(z^0)}.$$

It can be easily shown that if $\|v(t)\|\le 1$ is a function of $v(t)$, $u_1(t),\ u_2(t),\ u_3(t)$. They also meet the conditions $\|u_1(t)\|\le 1,\ \|u_2(t)\|\le 1,\ \|u_3(t)\|\le 1$. In the proposed controls, the game is $z_1^0,\ z_2^0,\ z_3^0$

from the initial position $T=\frac{\|z_1^0\|+\|z_2^0\|+\|z_3^0\|}{\lambda(z^0)}$, which means that $z_1(t)$, $z_2(t)$, $z_3(t)$ becomes zero. Really puts control in motion equations

$$\dot{z}_1=-\lambda_1(z_1^0,v(t))\frac{z_1^0}{\|z_1^0\|},\quad \dot{z}_2=-\lambda_2(z_2^0,v(t))\frac{z_2^0}{\|z_2^0\|},\quad \dot{z}_3=-\lambda_3(z_3^0,v(t))\frac{z_3^0}{\|z_3^0\|},$$

$$z_1(0)=z_1^0,\ z_2(0)=z_2^0,\ z_3(0)=z_3^0,$$

We must have a system of differential equations with the initial condition, solve them,

$z_1(t)=z_1^0-\frac{z_1^0}{\|z_1^0\|}\int_0^t\lambda_1(z_1^0,v(\tau))\,d\tau$, $z_2(t)=z_2^0-\frac{z_2^0}{\|z_2^0\|}\int_0^t\lambda_2(z_2^0,v(\tau))\,d\tau$, $z_3(t)=z_3^0-\frac{z_3^0}{\|z_3^0\|}\int_0^t\lambda_3(z_3^0,v(\tau))\,d\tau$, Let us take the equations 0‖ / ‖z_3 ^ 0 ‖ ∫_0 ^ _3 l_3 (z_3 ^ 0, v (t)). From these

$$\|z_1(t)\|+\|z_2^0(t)\|+\|z_3(t)\|=\|z_1^0\|+\|z_2^0\|+\|z_3^0\|-\int_0^t\left[\lambda_1(z_1^0,v(\tau))+\lambda_2(z_2^0,v(t))+\lambda_3(z_3^0,v(\tau))\right]d\tau\le\|z_1^0\|+$$

$$+\|z_2^0\|+\|z_3^0\|-\int_0^t\min_{\|v\|\le1}\left[\lambda_1(z_1^0,v))+\lambda_2(z_2^0,v))+\lambda_3(z_3^0,v)\right]d\tau=$$

$$=\|z_1^0\|+\|z_2^0\|+\|z_3^0\|-\int_0^t\lambda(z^0)d\tau=\|z_1^0\|+\|z_2^0\|+\|z_3^0\|-\lambda(z^0)t$$

equality. Understand, $\|z_1^0\|+\|z_2^0\|+\|z_3^0\|-\lambda(z^0)t$ t expression $t=T=\frac{\|z_1^0\|+\|z_2^0\|+\|z_3^0\|}{\lambda(z^0)}$ is zero. Therefore, at $t=T$, at least one of $z_1(t)$, $z_2(t)$, $z_3(t)$ is zero. This means that the game is over.

[1] The case we have just discussed is a case in $\alpha=3$. This is because the pursuers and the fugitives have the same capabilities, and the pursuers surround the fugitive. In this case the pursuers should certainly catch the fugitive, as is proved by this.

If the pursuers are the same, even if the pursuers do not encircle the fugitive, the escapee must be able to escape and flee to the most comfortable open space. From theorem 3 [1], m = 3 indicates how the chase should be avoided when the chase surrounds the escapee. This way you will have the opportunity to learn [1] while solving problems.

Although the problem points in [3] are written in simple differential equations, the number of runners varies widely. They run away as they please. We have one escapee in the matter we have learned.

[3] - In particular, the two-pointer coordinate axes in the first quarter on the plane, and the other two prove that the pursuers catch the fugitive in a game with two choppers and one runner in the same square. Note that if the game is moving across the plane rather than square, the runner will run away. If there is only one pursuit and one runner within that square, then the runner has the control that he or she will be able to walk for a limited time without leaving the square. This is a remarkable result now. A student who studies this case may find new options in it.

Thus, it is important to identify talented students and to develop their creative work on the topic chosen from differential equations. At the same time, solving and analyzing these types of issues allows students to develop their creative thinking and develop their creative competence.

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