Analysis on the Cultivation of the Outlook on Life in the Study of Mathematical Differential Courses

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Abstract: The biggest gap between people's values is the judgment of people's values. Judgment is inseparable from people's understanding of the world. There are two common problems: one is the idea of logical judgment; the other is the way of understanding things. Differential is a mathematical content, an element used for logical judgment and calculation of things. Its greater significance lies in the process of mathematics education is the practice, deepening and improvement of the outlook on life.

1. Introduction

The learning process of mathematics is, to a certain extent, the process of practicing, deepening, and improving the outlook on life. Mathematics can help to cultivate our rational thinking, give us the measurement and calculation methods of value, and theoretically link students to the world view, and provide many advanced technical means in the field of cognition. This is incomparable to the curriculum of college students' image thinking. The mathematics class is an irreplaceable high school education in the quality education of today's college students. Today, we take a look at dialectics from a lesson in differential learning.

First of all, let's talk about differentials. The differential is the content of our students' Advanced Applied Mathematics. From the narrow concept, it is the content of a lesson. In a broad sense, it is a basic culture course that runs through higher education. It is a science and engineering student. The most basic idea of education is the core idea of applied mathematics in higher vocational colleges: it includes the contents of the three chapters of limit, derivative and derivative application. Since the generalized differential idea is too big, I am only talking about the narrow differential concept today.

The Chinese differential word consists of "micro" and "minute" (1), where:

Tiny, small, tiny; less...

Points - division, separation; above is the eight characters, the following is the knife word... has the meaning of becoming smaller. So the combination of them means that small objects are subdivided, that is, smaller things. We call them "small things." From the field of thought and cognition, we call it the micro world more precisely; in general, we usually take The big aspect, the overall aspect, and the overall situation consider the science of grasping the world called the macro world. In the natural sciences, the microcosm usually refers to the physical world of molecules, atoms, and smaller particles of matter. That is to say: people's understanding of things comes from two aspects, one is the understanding of the macro world; the other is the understanding of the micro world. The macro world and the micro world are inherently dialectical and unitary, relative, and indispensable in the cognitive field. In mathematics, more often we know that the macro world and the micro world are not the material level, but the spiritual level. For most people, the height and depth of understanding the macroscopic field of things is similar, but the understanding of the micro-domain is very different. The latter can make a significant difference to the education level, educational effect and thinking of college students. In the education of students' outlook on life and values, how can we reach the realm of microcosm? Here, through differential learning, students can be aware of two aspects of understanding the realm of improvement:

2. Understand the path of the micro world

Understand the technical problems of the micro world

1) The path problem of the micro world

Everyone knows that the microcosm is "too small" and it is "difficult to recognize", and expression is even less "easy." Below, the differential teaches us the representation and calculation of the microcosm, and gives us a way to solve the problem of things.

First look at the representation in the microcosm: dx represents the differential of x, that is, the microscopic world of x, mathematically called the infinitesimal of x. Similarly, dw represents the differential of w, the microscopic world of w. The microscopic world of what matter is preceded by the letter d, for example, d (Zhang San) is the differential of Zhang San, indicating a very small Zhang San. This way we know the representation of the microcosm. For example, time is an important key element of the human world. It is represented by t. Each time can be seen as composed of infinitesimal dt. Countless dt constitutes a long river of history. The ancients say that the water flows into the sea. This is the truth.

Now let's take a look at the relationship of the microcosm: everything in the world has an ineviTable connection, so each differential of the microcosm is related. For the function of the derivable function, they have the following formula:

Unary function $y = f(x)$, then:

$dy = y'dx$(It is the derivative of the function y.) The microcosm of such a unitary function relationship is expressed.

For multivariate functions $w = f(x, y, z, \ldots, u)$, then:

$$dw = \frac{\partial w}{\partial x}dx + \frac{\partial w}{\partial y}dy + \frac{\partial w}{\partial z}dz + \cdots + \frac{\partial w}{\partial u}du$$

(Here: $\frac{\partial w}{\partial x}, \frac{\partial w}{\partial y}, \frac{\partial w}{\partial z}, \ldots \frac{\partial w}{\partial u}$ called the function w for the partial derivatives of the variables x, y, z, ... u.) The microcosm of the multivariate function relationship is also shown.

After knowing the microscopic value of each variable, the above formula can be used to accurately calculate the microscopic value of the function. That is to say, the relationship between the things in the microscopic world of the functional field can be calculated by the above formula, which is very important. And a convenient representation.

For non-conductible functions, they have the following formula:

Unary function $y = f(x)$, then:

$dy \approx \frac{\Delta y}{\Delta x}dx$(Here $\Delta y = f(x_0 + \Delta x)$-f($x_0$,Is the microscopic increase of the function y, which is the microscopic increase of the variable x.).

For multivariate functions $w = f(x, y, z, \ldots, u)$, then (3):

$$dw \approx \frac{\Delta w_x}{\Delta x}dx + \frac{\Delta w_y}{\Delta y}dy + \frac{\Delta w_z}{\Delta z}dz + \cdots + \frac{\Delta w_u}{\Delta u}du$$

Here:

$$\Delta w_x = f(x_0 + \Delta x, y_0, z_0, \ldots, u_0) - f(x_0, y_0, z_0, \ldots, u_0)$$

$$\Delta w_y = f(x_0, y_0 + \Delta y, z_0, \ldots, u_0) - f(x_0, y_0, z_0, \ldots, u_0)$$

$$\Delta w_z = f(x_0, y_0, z_0 + \Delta z, \ldots, u_0) - f(x_0, y_0, z_0, \ldots, u_0)$$

$$\Delta w_u = f(x_0, y_0, z_0, \ldots, u_0 + \Delta u) - f(x_0, y_0, z_0, \ldots, u_0)$$

The calculation of the microscopic world of such a non-conductible function is also expressed.

Other relationships are non-functional relations. We also say that everything in the world is related. According to the degree of correlation between variables, we use the method of clamping to simulate the above formula, so that the calculation results between the microscopic worlds are presented to us. The only result that itself brings to students is the judgment and formation of value.

For two functional u, v relationships:

$$d(u \pm v) = du \pm dv$$

$$d(uv) = udv + vdu$$

$$d\left(\frac{u}{v}\right) = \frac{vdu - udv}{v^2}$$

3. Technical problems in the micro world

The above is the method of how students carry out value calculation. Students still have many obstacles in the process of value judgment. The following is the technical processing of the functions $y = f(x)$ in the microcosm of the function (other relations are similarly processed): $(1)\Delta x = dx$

Such a differential of x is the microscopic increase of x, which is convenient for students to handle.

(2) Regarding the processing of dy, let us first look at the following figure (2):
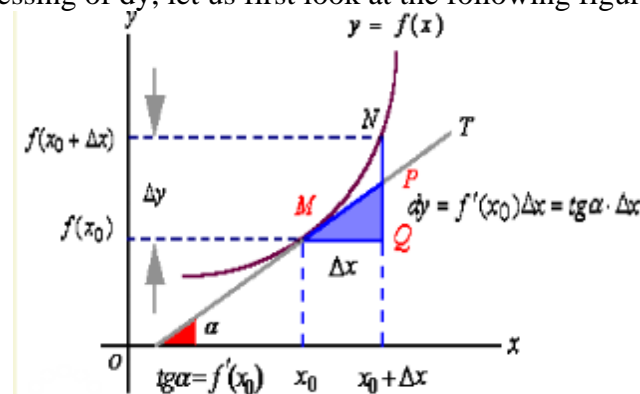
$$\Delta y = NQ = NP + PQ = dy + NP$$

Δy is the microscopic increase value on the curve and dy is the microscopic increase value on the tangent line.

Then $\Delta x \to 0, dy \approx \Delta y$.

In the macro world $dy \neq \Delta y$, but in the micro world $dy = \Delta y$.

This is the "unification of the curve and the line", or "the straight line."

The technical points contained in the above content is $dy = \Delta y$, is that "to make a straightforward song", Everyone knows that the changes and connections in the microcosm can be said to be very chaotic and diverse. Its performance is Δy, there is no regularity. We use $dy = \Delta y$, "to direct the song" to unify and simplify these changes. It is very helpful for students to understand nature. $dy = \Delta y$ That is the method and the technology. The following two columns are used for explanation.

Example 1: The measurement teacher asks the students to measure the length of the horizon of the classroom with a ruler. Is the horizon a straight line?

A: The horizon is an arc, an elliptical line of the earth. In the classroom, we measured the use of "in a straight line" to match the reality.

Example 1: The measurement teacher asks the students to measure the length of the horizon of the classroom with a ruler. Is the horizon a straight line?

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Example 2: There are three objects: billboard (planar), ball, and Buddha image. Their outer surface area is 10, and now the surface of the three objects is plated with gold of 0.005 cm thick. Q: How much gold do you need?

A: Both need $10 \times 10^4 \times 0.005 \times 19.32 \times 10^{-3}$kg=9.66kg.

As a billboard, it can be considered as a representative of "straight"

$m = \rho v = 10 \times 10^4 \times 0.005 \times 19.32 \times 10^{-3}$kg=9.66kg.

As the ball is of course "qu", the formula $v = \frac{4}{3}\pi r^3$ Is a function,"With a straight line" $m = \rho dv = \rho sdr = 10 \times 10^4 \times 0.005 \times 19.32 \times 10^{-3}$kg=9.66kg. This represents the "single generation" of the

functional relationship.

The relationship between Buddha statues here is very complicated, there is a functional relationship, and there can be non-function relations, but no matter how complicated the problem is, we use the "direct generation" to calculate.

The above example shows the idea of "single generation", which is the idea of dialectic. It is also the dialectic thought. It is also the transformation brought by mathematics to human thought. It is the basic cultural book of contemporary college students and the essence of college students' education.

Mathematical education gives us a judgment on values and teaches us the logical process of calculating value. Mathematics itself comes from real life. It is the basic course for engineering students. It is one of the most valuable courses in higher education. Special readers can understand and like.

Acknowledgement

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