Time Multidimensional

GuagSan Yu

(Harbin · Macro · Dynamics Institute. 150066, P. R. China **)**

E-mail:1951669731@qq.com

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Abstract: The traditional concept of space is three-dimensional, with a time dimension, that is, four-dimensional space. That is, time is one-dimensional. According to the theory of relativity, time and space are inextricably linked. Therefore, the space is multidimensional, so why is it that time can not may be also multidimensional. The dimension of time and space may be the same. This paper proposes that the dimension of time is the same as the dimension of space.

Key Words: Time dimension; Three-dimensional Time; Multiple Derivative; Multiple Inverse Derivative; Special relativity

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0 Introduction

In this paper, the dimension of time and the dimension of the space, is the same. Space is x, y, z the three-dimensional, corresponds to the space of that the time, also reflects is the three-dimensions.

1 The Dimension of Time

The dimension of the three-dimensional space, as shown in Figure 1.

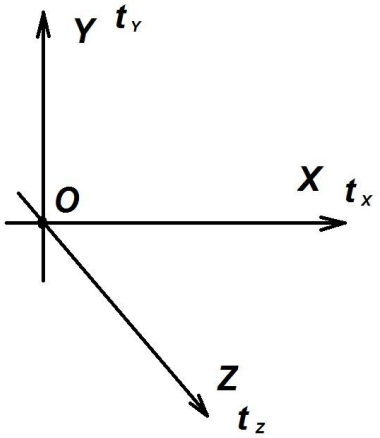

Figure 1

From the figure, we can see that the dimension of space are ***X***, ***Y***, ***Z***, and the dimension of time is t_X, t_Y, t_Z. The dimension of time corresponds to the dimension of space. The three time dimensions, corresponding to three spatial dimensions. Between the two have a close relationship.

2 Multiple Derivative and Multiple Inverse Derivative

In order to calculate the multidimensional time, so proceed the algorithm of function of many variables the derivative.

$$\frac{dy}{dx}=\lim_{\Delta x\to 0}\frac{\Delta y}{\Delta x}=\lim_{\Delta x\to 0}\frac{f\left(x+\Delta x\right)-f\left(x\right)}{\Delta x} \tag{2.0.1}$$

The formula (2.0.1) is the standard derivative formula. The formula for the multivariate derivative is:

$$\frac{dy}{d\left(x_1x_2x_3\right)}=\lim_{\Delta(x_1x_2x_3)\to 0}\frac{\Delta y}{\Delta\left(x_1x_2x_3\right)}=\lim_{\Delta(x_1x_2x_3)\to 0}\frac{f\left(x_{all}+\Delta x_{all}\right)-f\left(x_{all}\right)}{\Delta\left(x_1x_2x_3\right)} \tag{2.0.2}$$

Indicating that when $\boldsymbol{Y}$ is equal to a multivariate function, is it:

$$y=f\left(x_1x_2x_3\right) \tag{2.0.3}$$

In order to simplify the calculation, where the multiple function $\boldsymbol{x_1x_2x_3}$, simplified to $\boldsymbol{x_{all}}$. So:

$$y=f\left(x_{all}\right) \tag{2.0.4}$$

The multivariate derivative is the limit of $\boldsymbol{\triangle y\ /\ \triangle\left(x_1x_2x_3\right)}$ when the multivariate function $\boldsymbol{x_1x_2x_3}$ approaches zero.

The multivariate derivative is suitable for the calculation of multidimensional time. For example:

$$\frac{d\left(l_xl_yl_z\right)}{d\left(t_xt_yt_z\right)}=\lim_{\Delta\left(t_xt_yt_z\right)\to 0}\frac{\Delta\left(l_xl_yl_z\right)}{\Delta\left(t_xt_yt_z\right)}=\lim_{\Delta\left(t_xt_yt_z\right)\to 0}\frac{f\left(t_{all}+\Delta t_{all}\right)-f\left(t_{all}\right)}{\Delta\left(t_xt_yt_z\right)} \tag{2.0.5}$$

In the same way, we get the formula of the multivariate inverse derivative, and it is also the formula of the multivariate inverse derivative about the multidimensional time:

$$\frac{q\left(l_xl_yl_z\right)}{q\left(t_xt_yt_z\right)}=\lim_{\Delta\left(l_xl_yl_z\right)\to 0}\frac{\Delta\left(l_xl_yl_z\right)}{\Delta\left(t_xt_yt_z\right)}=\lim_{\Delta\left(l_xl_yl_z\right)\to 0}\frac{\Delta\left(l_xl_yl_z\right)}{f\left(l_{all}+\Delta l_{all}\right)-f\left(l_{all}\right)} \tag{2.0.6}$$

According to the principle of multivariate derivative and multivariate inverse derivative, new calculations about time and space can be realized, and new principles and new concepts of time and space can be obtained.

3 The Derivative and The Inverse Derivative of Time and Space

Three - dimensional space and three - dimensional time, the formation of complex three - dimensional space - time. To multiple derivatives and multiple inverse derivatives, the most suitable for expression.

For example the formula:

$$P_d=\frac{d\left(l_xl_yl_z\right)}{d\left(t_xt_yt_z\right)} \tag{3.0.1}$$

Is the multivariate derivative of the complex three-dimensional space-time, which represents the limit of the corresponding three-dimensional space when the three-dimensional time approaches zero.

Another example is the formula:

$$P_q = \frac{q\left(l_x l_y l_z\right)}{q\left(t_x t_y t_z\right)} \tag{3.0.2}$$

Is the multivariate inverse derivative of the complex three-dimensional space-time, which represents the limit of the corresponding three-dimensional time when the three-dimensional space approaches zero. The formula (3.0.2) is best used to represent time and space. Because, when the space is close to zero, the size of the time in formula, it will represent the speed of time (In principle, the greater the time in the formula, the slower the representative time; the smaller the time, the faster the representative time). That is, in a certain space, the time to run fast or slow.

Therefore, the formulas (3.0.1) and (3.0.2) can be regarded as derivative of the time and space and the inverse derivative. Especially in the formula (3.0.2), is more applicable and important.

4 The Continuation of Time

The formula (3.0.2) is equivalent to the inverse derivative of a product. Is namely:

$$\begin{aligned} P_q &= \frac{q\left(l_x l_y l_z\right)}{q\left(t_x t_y t_z\right)} = \lim_{\Delta\left(l_x l_y l_z\right)\to 0} \frac{\Delta\left(l_x l_y l_z\right)}{\left(t_x+\Delta t_x\right)\left(t_y+\Delta t_y\right)\left(t_z+\Delta t_z\right)-t_x t_y t_z} \\ &= \lim_{\Delta\left(l_x l_y l_z\right)\to 0} \frac{\Delta\left(l_x l_y l_z\right)}{t_x\left(\Delta t_y t_z + t_y \Delta t_z + \Delta t_y \Delta t_z\right)+\Delta t_x\left(t_y t_z + \Delta t_y t_z + t_y \Delta t_z + \Delta t_y \Delta t_z\right)} \\ &= \frac{q\left(l_x l_y l_z\right)}{t_x\left(q t_y t_z + t_y q t_z + q t_y q t_z\right)+q t_x\left(t_y t_z + q t_y t_z + t_y q t_z + q t_y q t_z\right)} \end{aligned} \tag{4.0.1}$$

If we say that time t is the inverse function of space l, it namely:

$$t = f^{-1}\left(l\right) \tag{4.0.2}$$

Then, the formula (4.0.1) is the inverse derivative of time and space, and its time and space are multidimensional.

Time and space the function, and time and space of the derivative, what is the difference between the two? The former, apparently about the rules, between of time and space, has a certain range and a certain relationship. The latter, is a very small value that satisfies the former attribute, and has a definite position. Then it is very interesting, especially when we are talking about is related to the time, such a problem.

When we use the function to express the time, it means is that history and the past. Is it what has happened. And the derivative, or especially the inverse derivative, when we are used to express the time, that it is expressed, is a very short moment. Is the new thing, that is, the emergence and occurrence of new things, or it is simply a new time emerged, it is a new time.

Time is constantly disappearing and disappear to become the past, and constantly instantly produce and create, to one after the other to develop before and after to continue. When use the derivative or inverse derivative to express the time, that is the time to generate and create in that a moment.

Thus the function representing time to a certain range and history, the derivative and the inverse derivative, represent a moment of new time. In this way, the formula (4.0.1) is very interesting. After the last equal sign of the formula, we notice the composition of the original function that contains it. This is because the formula is equivalent to the inverse derivative of a product. The derivative or the inverse

derivative of the product, after its solution, its involves the initial component of the function. Is not able to exclude, and must exist.

This is the key to the problem. The formula (4.0.1) contains the components of the initial function in the inverse derivative of the formula. The inverse derivative of the formula, can be seen as the moment of the new time. And in this formula, but also contains the representative of the past and the history of the original function of the composition. Then there is no doubt, that this formula indicates, that the time from the past to the future, have an impact, this important attribute.

This is very important, it shows the causal continuity of time, indicating the time before and after the source, is extremely important.

Thus, the multivariate derivative and the multivariate inverse derivative, especially the latter, can represent the causality of time, and the continuity before and after.

$$P_q = \frac{q\left(l_x l_y l_z\right)}{q\left(t_x t_y t_z\right)} = \frac{q\left(l_x l_y l_z\right)}{t_x(qt_y t_z + t_y qt_z + qt_y qt_z) + qt_x(t_y t_z + qt_y t_z + t_y qt_z + qt_y qt_z)} \tag{4.0.3}$$

In the formula, there is every time element of the inverse differential symbol ***q*** its have, which represents that instant, instantaneous new time. There is no the symbol that the time element, it is the composition of the original function, which represents the composition the time of the past and history.

Therefore, in the calculation of the time of the multiple inverse derivative, in the new creation and the time of production, it contains the factors of past and historical influence. It is shown that the concept of time multidimensionality is of great significance to the causal law of time. So it is likely to be real, and directly affect the laws and rules of nature.

If the time is one-dimensional, as described above by the inverse derivative and derivative its to denote time, thereinto that is the case of past and historical components, does not exist.

5 Time the Change

According to the special theory of relativity, the object in space movement, time will slow down.

$$t_2 - t_1 = \Delta t = \frac{t_2' - t_1'}{\sqrt{1-\frac{u^2}{c^2}}} = \frac{\Delta\tau}{\sqrt{1-\frac{u^2}{c^2}}} > \Delta\tau \tag{5.0.1}$$

When the speed of its movement, to reach the speed of light, its the time is to stagnation, become zero. And the movement of matter, usually linear one-dimensional movement. This paper presents the time is three-dimensional. Therefore, due to the movement of the object, to make the time the state to slow down, it will be suppressed.

The time is three-dimensional, it is the product of the three-dimensional time variable corresponding to the three-dimensional space. Then the usual meaning, the so-called time, the actual is:

$$t_f = \sqrt[3]{t_x t_y t_z} \tag{5.0.2}$$

Is the extraction cube root of the time product of the three-dimensional variable.

If the three-dimensional variable time, the three-dimensions of the value is the same. Then:

$$t_x = t_y = t_z = \sqrt[3]{t_x t_y t_z} \tag{5.0.3}$$

We usually called the time - one day, two days or one year, two years, etc., is the three-dimensional

time variables to extraction cube root.

The special theory of relativity states that the one-dimensional movement of the object makes it time slower, even until it becomes zero. What it actually affects is one dimension in three-dimensional time. One dimension in a three-dimensional time, slowing down or becoming zero, should not make the whole time of the object, both equal and slow to zero. Because the other two dimensions of the time, still exist and are not affected.

For example,one moving object, its that the time, in movement direction and the dimensionality, is has changed. If it changes a certain multiple, such as $\boldsymbol{\beta}$, then:

$$t_f = \sqrt[3]{(\beta t_x)\, t_y t_z} = \sqrt[3]{\beta} \cdot \sqrt[3]{t_x t_y t_z} \tag{5.0.4}$$

Its the actual change of time, is the extraction cube root in $\boldsymbol{\beta}$ multiple. Than the object in the movement direction and dimensionality, the time change the multiple $\boldsymbol{\beta}$ is smaller(Of course, if a change multiple in its one dimension, is infinity or infinitesimal, then the actual time change will also be infinite or infinitesimal).

So the change corresponding to the three-dimensional time, which has a more profound connotation.

6 Summing-up

Time and space are similar, but also has three dimensions. On the three-dimensional time, the multiple inverse derivative calculation method shows the causality of time, and continuity. In the newly generated time, it contains ingredients or effects of past time. Multiple inverse derivative calculate method, to pointed out that this point is extremely significant. It shows that the cause and effect of the event is not necessarily determined by the nature of things. May be in pure time, that is exist such an impact factor.

Is it affair, is it symbolic logic, or is it simply a pureness the time? What is the greatest impact on nature? Everything await we to do more research and exploration.

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时间的多维性

庾广善

(Harbin · Macro · Dynamics Institute. 150066, P. R. China **)**

E-mail:1951669731@qq.com

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摘要：传统的观念,空间是三维的，加上一个时间的维度，就是四维空间．即时间是一维．根据相对论，时间与空间是密不可分的．因此，空间是多维的，那么为什么时间，不可以也是多维．时间与空间的维数，可能是相同的．本文提出，时间的维数与空间的维数，是相同的.

关键字：时间维度；三维时间；多元导数；多元逆导数；狭义相对论

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