

Study on symmetry of second type curve integral

Ming Wan

Nanchang Institute of Science & Technology, Nanchang 330108

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Abstract: the second type curve integral is defined function in the plane or space curve segmentpoints. This paper mainly use Stokes formula. Full explanation of the second type curve integraltechnique. Combined with concrete examples andsummarize its references the characteristics, application of familiar with various methods.

Introduction

The curve integral of type second has obvious geometric meaning and physical meaning compared with the first type curve integral,The first type curve integral can be regarded as the calculation of definite integral,The calculation of the second type curve integral is also called the integral of the coordinate, which has the directivity of the first type curve integral, the calculation is complex, and the physical meaning is obvious, This has important applications in physics. For different types of the integrand, the corresponding calculation methods are also different. In order to make the calculation more simple, this paper expounds the calculation method of line integral of the second type, not only through the parameter equations into integral calculation,But the plane curve can also through the Green formula into the calculation of double integral of the second kind of curvilinear integral can also according to the symmetry of parity two kinds of simplified calculation or by using mathematical software Mathematic to calculate.

Literature review The evaluation of domestic and foreign research status.

From the above related can be seen, the researchers calculate many of the second type curve integral is discussed from different aspects, but only from one aspect of discussion, most of the literature are not combined with mathematical software Mathematic space drawing and calculation. Second curve integral has a variety of ways, then it is the specific method of calculation? In this paper, on the basis of the literature on this issue are summarized, the mathematical software Mathematic is also used in them, and giving some targeted and typical examples.On the plane, the bivariate $F(X,Y)$ function of smooth curve $C(A,B)$ on the plane divides the curve into a rational one,

which is divided into two parts: A_0A_1 , A_1A_2 , ..., $A_{n-1}A_n$, inside, $A_0 = A, A_n = B$.

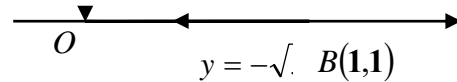
Shad small arc $K, A_{k-1}A_k$ and $\overrightarrow{A_{k-1}A_k}$ The long distance between X and Y the axis and axis is identical with Δx_k and Δy_k . At small arc $K, A_{k-1}A_k$ Take a bit $\overrightarrow{E_k}(\varepsilon_k, \eta_k)$ in sum.

Computation of the line integrals of the second form

Five calculation methods of curve integral are introduced: direct calculation, green formula, curve and path independent calculation, using symmetry and symmetry and mathematical software mathematic.

Threshold: the starting point of the xian—, the upper limit —zhongdian. we illustrate the application of this method through several examples. Example 1 $\int_L xy dx$, It is a L parabola. $y^2 = x$ since $A(1,-1)$ to $B(1,1)$.

Jieruoqu as x parameters, then: $\widehat{AO} + \widehat{OB}$,



$$\widehat{AO} : y = -\sqrt{x}, x: 1 \rightarrow 0,$$

$$\widehat{OB} : y = \sqrt{x}, x: 0 \rightarrow 1,$$

$$\begin{aligned} \therefore \int_L xy dx &= \int_1^0 xy dx + \int_0^1 xy dx \\ &= \int_1^0 x(-\sqrt{x}) dx + \int_0^1 x\sqrt{x} dx \\ &= 2 \int_0^1 x^{3/2} dx = \frac{4}{5}, \end{aligned}$$

If taken y as a parameter,

图 1

$$\begin{aligned} \text{so } \int_L xy dx &= \int_{-1}^1 y^2 y (y^2)' dy, \\ &= 2 \int_{-1}^1 y^4 dy = \frac{4}{5}. \end{aligned}$$

Using the mathematical software mathematic to calculate

The approximate numerical calculation of definite integral in Mathematica system is nintegrate, its calling format is as follows $\text{NIntegrate}[f(x), \{x, a, b\}]$,

In OFF-LINE-SINEWAVE is the integral function, for the integral variable, the lower limit, for the integral upper limit, sometimes can be obtained, we use Mathematica to calculate the example 1, example 2, example 4, and the Li 5. Li solution if selected as parameter input. $I1 = \text{NIntegrate}[-\sqrt{x} * x, \{x, 1, 0\}]$,

$$\begin{aligned} I1 &= \text{NIntegrate}[x * \sqrt{x}, \{x, 0, 1\}], \\ I &= I1 + I2. \end{aligned}$$

Get the 0-8. ruoxuanqu as parameter input $\text{Integrate}[y^2*y^2y, \{y, -1, 1\}]$ result $\frac{4}{5}$.

If we enter $\text{NIntegrate}[y^2*y^2y, \{y, -1, 1\}]$.

result 0.8 .

Conclusion

Main points of the second type curve integral integrand function has a variety of types, students in the time to do the students vulnerable to the limitations of thinking, for different types of somehow, in addition, for some types of topics to a given problem, although one can solve, but sometimes seem tedious, then it can think of other methods, so that the problem becomes simple. We can also use the mathematical software Mathematica to solve the simple calculation.

The implications for different types of the integrand, the calculation method of the second type curve integral made a systematic analysis on the easy to use what method calculation and flexible use of computational techniques are helpful in the title, so as to further improve the students' ability of problem solution, formula and theorem memory good.

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