THE ROLE OF INTEGRALS IN PRACTICAL PROBLEMS

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Abstract . This in the article of the integral practical in matters place and his/her various in the fields application seeing Integral mathematics , in particular , geometry, physics, mechanics, economics, ecology, medicine and in statistics wide is used . In the article integrals using areas, volumes, energy amounts and other various practical issues how to be counted and they how use indicating examples Also, the integral in practice of application importance and his/her various in the fields in development place analysis will be done .

Key words : integral, geometry, physics, mechanics, economics, ecology, medicine, statistics, area, volume, energy, probability distribution .

ENTRANCE

Mathematics not only abstract concepts complex , maybe various sciences and in the fields practical solutions presented provider scientific is a tool . Mathematician analysis main from departments one integral calculus, especially natural and technician in sciences wide The concept of integral is used . various processes modeling, movement trajectory, surface area, volume, energy, economic changes and biological processes analysis in doing important place holds

The concept of integral ancient In Greece Archimedes by initial in the form applied became , and later Newton and Leibniz by fundamental mathematics basics working Newton differential and integral calculus mechanics movement laws justification for used if, Leibniz integrals formulation and their practical implementation in development big to share has This is theoretical fundamentals, especially engineering, physics and economy such as in sciences wide applied in real life complicated processes modeling and prophecy to do opportunity gives.

Today integral calculation per day modern software software, such as MATLAB, Wolfram Mathematica, Python, and Maple computer programs using automated without done This is technologies integral calculus processes accelerate, complicate analyses done to increase opportunity creates. This in the article of integrals different in the fields place and their real practice importance deep analysis will be done .

LITERATURE ANALYSIS

Integrals theory and to practice related many scientific affairs For example , in physics integrals mechanics main laws in determining used (Feynman, 1964), in economics and they cost and benefit models analysis in doing used (Samuelson, 1983), engineering in the field and integrals construction and aerodynamics in their calculations wide is used (Kreiszig , 1999).

Also, integrals to statistics related Application is also important importance has. Probability theory and statistic analysis according to Burington and Maytin's (1974) research integrals using probability distributions and regression analysis how done increase possible shows . From this except , by Greenberg (2008) working issued economic modeling methods of integral calculus economic forecast and financial to analysis the impact learns .

Information technologies and artificial intellect integrals in the field wide For example, Bishop (2006) in his work " Pattern Recognition and Machine Learning" integrals using probability models build and neuron networks teaching processes seeing This is modern technologies in development of integrals place how much important that again one there is confirms .

MAIN PART

1. Geometry and fields calculation. Integrals in geometry various of forms surface and size in calculation wide applied . Mathematics The concept of integral in analysis Lebeg integral and Roman integral such as to types is separated . In particular , Riemann integral geometric fields in calculation important place holds .

Roman integral through field and volume calculation principles physicist and in engineering modeling for is used . Many complicated of forms field and using integral calculation possible. For example, a curve line under field face calculation (S), paraboloid shaped of the container size calculation (V) following integrals using is defined as :

$$S = \int_a^b f(x)dx, \qquad V = \pi \int_a^b f^2(x)dx$$

Architecture and construction in the field different buildings and of bridges size , structure downloads Integral methods in determining wide For example, the slope roofed of buildings surface using area integral is considered .

Architects and builders often uneven of forms field and size calculation from integral methods for For example, a bridge load distribution in the structure , building structure strength in evaluation integrals is applied .

2. Physics and in engineering integrals. In physics integrals application very wide to the scope has is, it is motion, work, energy and electricity fields such as concepts in calculation is used .

Classic integral calculus in mechanics Newton's second law through speed and the way to calculate is based on :

$$x(t) = \int v(t)dt$$

Also , electromagnetic in the fields Coulomb to the law according to , power area :

$$E = \int_b^b \frac{k}{r^2} dr$$

is considered in appearance.

Car speed and road click Integral methods in determining road movement in the analysis It is also used for electricity . and heat distribution integrals in calculus is used .

In mechanics engineers car engines energy spending , effort trajectories determination from integral methods for they use . Electronics and using integral in optics electricity field strength and light waves distribution is considered .

3. Economy and Integral applications in finance . Using integrals in economics total income , demand and offer changes is determined .

In macroeconomics consumption and investment functions often integral calculus through is determined . For example , the total working release size as follows is expressed as :

$$Q = \int_0^T f(t)dt$$

Here $f(t)$ – time according to working release function .

Customs and tax in systems various tariffs calculation , inflation forecast to do and investment risks integral analysis in evaluation wide is applied .

4. Biology and in medicine integrals. Biological processes analysis integral models in making is applied .

Biological integral calculus in systems population growth modeling for is used . Lotka-Volterra equation predator and prey population change represents :

$$\frac{dx}{dt} = ax - bxy, \qquad \frac{dy}{dt} = cxy - dy$$

In medicine blood in the content medicine concentration detection , radiation the impact study and epidemics spread in modeling from integrals is used .

CONCLUSION

Integrals mathematician analysis inseparable part is different natural and technician in sciences important importance profession Their using various geometry , physics , economics , engineering and statistics issues clear and effective solution to do possible . Integrals in practice wide application their importance further increases and them study today's on the day every one technician expert and scientist for necessary become remains .

Modern science and technologies developing integral calculus under conditions methods further improvement and automated to systems integration to be done important importance profession For example , artificial intelligence , machine study and big in size information analysis to do in the processes of integrals place is incomparable . Therefore , in the future this in the field research further developed , new innovative solutions appearance to be service does .

So so , the integrals study and their practical application understanding today's scientific and technological in progress big importance They have . various in the fields applied , scientific of research accuracy increases , engineering processes optimizes and economic modeling improves . This is of integrals not only theoretically , maybe practical also important in terms of that confirms .

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