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Mathematics In Real Life

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Abstract: Historically, most students have been struggling with mathematics subject which makes them wonder if they will ever apply the knowledge in real world life. Teachers and parent admit when they have been asked that students have less knowledge about the relevance of mathematics in real life. This paper is based on application of mathematics in real life. In this paper the most common and essential applications of mathematics in real life are discussed such as finance and banking, weather prediction, computers and its games. Apart from these some advanced applications are also discussed such as satellite navigation, military and Defense and crime prediction.

Keywords: Mathematics, Real life, Finance and Banking, Satellite Navigation, Military and Defense

1. Introduction

Mathematics is the key to opportunity. No longer just the language of science, Mathematics now contributes in direct and fundamental ways to Business, Health, Finance and Defense. For students it is very important subject because it opens doors to careers therefore students must be capable to relate this subject with their real life. Therefore, teachers of mathematics must teach mathematics through real concepts in personal life of students. If mathematical concepts are taught via teachers formally then students will face many problems and they cannot solve it.

The mathematical instructions should enable students to,

1) Recognize and use connection among mathematics ideas.
2) Understand how mathematics ideas interconnect and builds on one another to produce a coherent whole and finally.
3) Recognize and apply mathematics in contents of mathematics.

2. Necessity

1) Students should have ability to use their knowledge of mathematical modeling and data analysis to understand societal issues and workplace problems in reasonable depth.
2) They should be confident to explain complete applications in the outside world by using mathematics.
3) They not only learn to execute connections, but they learn to take advantage of them using insights gamed in one context to solve problems in another.

3. Real Life Applications of Mathematics:

3.1 Finance and Banking

To exhibit the importance of Mathematics in the Banking sector, few points are compiled below:

(a) **Daily Accounting Operations*:*** Right from the teller to the branch manager; anyone working in the Banking sector handles large sum of money daily. Therefore, they must have the basic arithmetic skills like addition, subtraction, multiplication, division. The calculations involved are centered on debit-credit and account balancing.

(b) **Policy Formulation*:*** Top ranking banking officials have the responsibility of creating a practical and implementable financial policy for the bank that may help the organization reach its goals for the financial year or any predefined time period.

(c) **Risk Assessment*:*** Mortgages and Loans form the crux of the banking industry and risk assessment for such cases can only be evaluated using complex mathematical models. Risk assessment is a very important aspect for which banking professional will have to employ complex mathematical skills and models to measure the amount of risk exposure for the organization and deploy counter measure to control the damage.

(d) **Economics*:*** Keeping an eye on contemporary macro actions and trends, to calculate and predict the future course for domestic as well as international economy.

(e) **Financial Trends & Predictions**: This is another very important aspect of the banking industry that completely relies upon mathematics. In order to arrive at credible and actionable predictions for the future; banking professionals may have to rely upon models like Stochastic calculus.

(f) **Investment Banking*:*** Although relatively new and evolving aspect; investment banking has emerged as one of the fastest growing fields of the banking industry. When it comes to investment banking, professionals have to rely on multifaceted financial mathematics. These may include **partial differential calculus, probability, stochastic calculus** and others similar concepts.

3.2 Weather Prediction

The weather is a fantastically complex system, with billions of molecules interacting. This makes predicting the weather an incredibly difficult tasks, even using the extensive network of weather stations, satellites, and the world's largest supercomputers.

The computations related to weather forecast is connected to **fluid dynamics** and the equation used for weather forecast is **Navier stock equation**. To be more precise, we solve equations related to fluid flow under certain conditions like **conservation of mass, energy, and continuity equation**. The initial state of the atmosphere is defined with various parameters such as temperature, pressure, humidity etc. Then a future predicted state is reached through computations. In view of the non-linearity of the relations between various state parameters, the exact solution of equations becomes very tedious. Hence numerical approach is adopted where in the atmosphere is divided into grids and levels and equations are solved.
But even tiny differences in measurements and the simulation parameters can have great effect on these predictions. Therefore it is still impossible to accurately predict the weather more than a few weeks in advance – but the accuracy of mathematical models and speed of computers will only improve in the future.

3.3 Computers

Computer can be understood as combination of mathematics and physics used for technology, engineering and research. Along with physics, mathematics is one of the foundations of computer sciences. Although advanced mathematics is not applied frequently, basic mathematics and most importantly, **algebra** is the main reason for success behind a successful computer scientist. The main branches where mathematics is applied in computer science is as follows:

3.3.1 Arithmetic, comparison, logical, assignment and conditional operators make use of mathematics.

3.3.2 Algorithm that lay the foundation of computer science relies heavily on mathematics.

3.3.3 Theoretical computer science involves a lot of mathematics which deals with mathematical structure that are discrete rather than continuous.

3.3.4 Theoretical computer science involves a lot of mathematics in the form of graphs, algorithms, algebra, quantum computation, computational geometry and computational number theory.

3.3.5 Computer operates on binary digits which is basically mathematics.

3.3.6 A computer programmer may not need mathematics in the beginning but as programming advances, more advanced mathematics is used.

3.4 Transportation and Logistics

The mathematics of transport and logistics aims at optimizing the design and the operation of networks for the movement of persons and goods. Such networks can be modelled as graphs, in which commodities flow from their sources to their destinations. The mathematical treatment of such models leads to large-scale integer programming problems, whose solution requires the development of novel efficient algorithms.

Transportation and logistics problems often have a special flavour that depends on the application. Train composition in railway planning leads to algorithmic hyper graph theory, user behaviour in public and road traffic requires algorithmic game theory, aircraft performance is treated best by discrete- continues models, sustainable manufacturing network gives rise to multicriteria optimization, operation theatre scheduling leads to robust optimization, and so on. To solve such problems, we combine problem specific research that aims at understanding this special structure with general approaches to deal with very large networks. Foci of our work are on the development of adaptive coarse-to-fine graph generation approaches in discrete analogy to finite element methods, and on decomposition methods for the integrated treatment of multiple model layers.

3.5 Crime Prediction

If we have seen the TV series you will remember many ways in which mathematics was used by the FBI. And while most of these examples were made up, mathematics does have real applications when mapping, predicting and preventing crime. For example, the behaviour of a burglar could be modelled patrols.

Research developed during the last few decades in the field of crime analysis has reached a very important conclusion: some specific types of crime always happen in the same places, giving rise to the formation of crime hotspots.. Using **probability, statistics,** and swarm dynamics, they found that there are two kinds of hotspots which react very differently on police intervention.

3.6 Computer Games

Many computer games use 3D graphics. Moving and animating these on a 2-D screen, also light and shadows, rendering colors requires **matrices, vectors** and many other concepts from **3D geometry and linear algebra**. In computer games realistic water and animate moving and colliding physical objects. For this, they use numerical solutions to the appropriate partial differential equations, such as Navier-Stokes equations which model fluids.

3.7 Satellite Navigation

To determine any location on earth such as position, speed and local time of a person and vehicle satellite navigation systems like **GPS (Global Positioning System)** use signals from satellites. These signals are extremely accurate times. By finding their delay, a computer can calculate how far away the satellites are. If know the distance from at least three different satellites, and the position of these satellites, we can find the unique and exact position of the receiver on Earth. Metrics Space are the mathematics generalization

of measuring distance. Because of general relativity, GPS receivers have to use Kerr metric to calculate distances, rather than usual Euclidean metric.

3.8 Defense and Military

In addition to providing the framework for designing new technologies and weapons, or solutions to logistical problems like the transportation of soldiers, weapons and food, mathematical models can be used to develop and simulate complex military strategies. These simulations might involve game theory, statistics or probability. In recent years, cyberwarfare has become increasingly important, for counterintelligence, industrial espionage, and terrorism.

Conclusion:

Mathematics is unavoidable. It covers all aspects of real world. As it seen from all above applications that mathematics is very important tool in making computer games, in designing websites, and in money management. Mathematics is useful and significant in our daily life as it is associated with our everyday activities, developing our critical and practical abilities. Therefore, students must be capable to relate this subject with their real life. Thus it is important to create new circumferences for mathematics education and teachers of mathematics have to teach mathematics through real concepts in personal life of students.

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