Modelarea matematică a indicatorilor de calitate a corpurilor de apă de suprafaţă şi a apelor uzate

Importanţa apei pentru viaţă, ca o componenta a ecosistemului global, este din ce în ce mai clară. Directiva Cadru privind Apa, (Water Framework Directive), reprezintă o abordare nouă şi inovatoare, care extinde scopul protecţiei apelor către toate tipurile de apă şi stabileşte obiective clare pentru ajungerea la un stadiu bun de calitate. Obiectivele trebuiesc atinse până în 2015 pentru toate ţările din Europa şi astfel să fie asigurată folosirea durabilă a resurselor de apă în toată Europa. În esenţă, Directiva Cadru privind Apa are drept scop prevenirea poluării la sursă şi stabileşte mecanismele de control în scopul protejării apei şi pentru utilizarea durabilă a acesteia.

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[Submitted on 27 May 2009]

Limits of Educational Soft "GeoGebra" in a Critical Constructive Review

Valerian Antohe

Mathematical educational soft explore, investigating in a dynamical way, some algebraically, geometrically problems, the expected results being used to involve a lot of mathematical results. One such software soft is GeoGebra. The software is free and multi-platform dynamic mathematics software for learning and teaching, awards in Europe and the USA. This paper describes some critical but constructive investigation using the platform for graph functions and dynamic geometry.

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GeoGebra software in teaching-learning process

Valerian Antohe
Pedagogical High School "D.P.Perpessicius", Brăila, România

ABSTRACT: The development of computer technologies can be seen as a miracle in the modern civilization. What new reality of the IT surrounding environment have brought to us now was unthinkable several decades ago. The level of information and its flow on different communication channels, its impact on the individual are more and more difficult to quantify. A great challenge for educational systems is to create some harmonious co-existence between face book, wikis, virtual realities, virtual learning and traditional methods. The examples presented will illustrate the impact of GeoGebra software in this sense.
KEYWORDS: virtual learning, teaching, tactics, strategies.

Introduction

Since the school year 1998 a new curriculum was implemented in the Romanian secondary school. This reduces the number of mathematics hours per week and some teaching topics too. For example, problems of plane geometry, study of geometrical locus problems, study of some real function in terms of graphics representation, series of real numbers may be just some topics that have undergone serious changes. According to our national curriculum every school can prepare his own curriculum, accepted by students, proposed by teachers. In this sense computer based math education was implemented to teaching process and for applying such ideas of modern teaching. GeoGebra software can help the teachers to implement ICT projects into their teaching. In this sense, some math topics that are not declared compulsory in curriculum can be studied. Hence, the aim of this study is to find out strategies in order to use GeoGebra as a method of teaching and analyze possible effects of these strategies.

[Submitted on 27 May 2009]

Mathematical Models in Danube Water Quality

Valerian Antohe, Constantin Stanciu

The mathematical shaping in the study of water quality has become a branch of environmental engineering. The comprehension and effective application of mathematical models in studying environmental phenomena keep up with the results in the domain of mathematics and the development of specialized software as well. Integrated software programs simulate and predict extreme events, propose solutions, analyzing and processing data in due time. This paper presents a browsing through some mathematical categories of processing the statistical data, examples and their analysis concerning the degree of water pollution downstream the river Danube.

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Subjects: **Other Computer Science (cs.OH)**
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Danubius International Conferences, Digital Challenge Scientific Session 2023

Coming back to reading to re-discover the science

VALERIAN ANTOHE
Last modified: 2023-10-18

Abstract

Scientific literature frequently engages with real-world predicaments and their prospective resolutions. The exploration of such literature can serve as a catalyst for innovative problem-solving and the cultivation of inventive ideation. The proposed methodological approach initiates with the re-examination of selected mathematical problems introduced in the annals of mathematics long ago. These mathematical tasks will to be meticulously scrutinized within the purview of GeoGebra touchscreen instructional modules. Within the spheres of learning and professional development, the perusal of scientific literature assumes a pivotal role, providing foundational knowledge and nuanced insights that may be pragmatically implemented in educational and professional milieus. The learning journey begins with the presence of an antiquarian scientific tome on the educator's desk. This necessitates the formulation of novel instructional methodologies in the proposed context. The judicious amalgamation of these pedagogical paradigms into educational projects carries the potential to engender "meta-mathematical" proficiencies, particularly salient in the context of technological instruction and its associated applications. From a sociological standpoint, this pedagogical shift may substantially recalibrate conventional perceptions of mathematics from an isolating intellectual pursuit to one characterized by harmonious social interaction. This recalibration necessitates a confrontation of established learning paradigms, a challenge which I shall illustrate through relevant examples.

Anale. Seria Informatică. Vol. VII fasc. 2 – 2009
Annals. Computer Science Series. 7th Tome 2nd Fasc. – 2009

From "Nolite turbare circulos meos!" to “Don’t delete my folder”

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REZUMAT. Arhimede își desena figurile pe nisipul plajei, pe pământ bătut sau în cenușă pusă pe o pardoseală ori pe propriul său corp, uns în prealabil cu untdelemn; pe corp trasa figurile cu ajutorul unghiei. Când generalul roman Marcellus a cucerit în anul 212 î.e.n. Siracusa din Sicilia, orașul lui Arhimede, un soldat roman a dat peste acest geniu contemplându-si cercurile pe care le desenase pe nisip. "Nolite turbare circulos meos!" (nu-mi strica cercurile) i-a strigat Arhimede soldatului; dar romanul, iritat, l-a înjunghiat cu spada, omorându-l. În zilele de azi locul de exprimare a ideilor matematice a fost înlocuit de ecranul calculatorului iar platformele dedicate studiului matematicii au deschis o nouă perspectivă domeniului cercetării. O incursiune în domeniu este desigur o provocare dar și o invitație pentru educați și educatori.

1. Dynamic mathematics software

Archimedes drew his figures on beach sand, mud or ash on a floor or put on his body, previously anointed with oil; on his body the figures were drawn with nails. When the Roman general Marcellus conquered in 212 BC Siracusa in Sicily, the city of Archimedes, a Roman soldier came across this genius contemplating his drew circles on the sand. "Nolite turbare circulos meos!" (Do not break my circles) told Archimedes to the soldier, but this, irritated, stabed him with the sword, killing him.

Today the place of the geometric constructions is on dynamic platforms supported by specialized software. One of these platforms is GeoGebra software. As the inventor stated, GeoGebra is dynamic mathematics software for all levels of education that joins arithmetic,

GeoGebra in the Context of the IT Surrounding Environment and Curriculum, 2010

PhD. Math. **Valerian ANTOHE**
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Abstract: The development of information technology radically changes our way of living, of communicating with the others, of receiving the information. In the future, it is expected that the role of computers in our life become essential; any student will have to master this field in order to achieve easily what he wishes. This presentation covers some ideas that were developed after the first activities carried out under the GeoGebra Institute of Timisoara, Romania, in the eastern part of Romania and our strategies in connection with the development of a broad community of users nationwide.

We live in a world subject to dynamic changes. The level of information and its flow on different communication channels, its impact on the individual are more and more difficult to quantify. Filters of the informational flow, imposed by the educational system, may lead to progress when this approach is in agreement with a modern and well planned educational desideratum or may lead to disasters when it is imposed by social or political manifestations which are not focused on the development of the individual.

We will look into the concept of "homo – informaticus" and the extent to which it can be influenced by the GeoGebra Factor.

Keywords: Educational Environment; GeoGebra (GF) Factor; IT Surrounding Environment

Analele Ştiinţifice ale Universităţii „Alexandru Ioan Cuza", Secţiunea Genetică şi Biologie Moleculară, TOM XI, 2010

STUDY CONCERNING THE MATHEMATICAL SIMULATION AND THE INTERPRETATION OF QUALITY INDICATORS OF SUCEAVA RIVER

CRISTINA MAXIM[*], VALERIAN ANTOHE[1], DUMITRU COJOCARU[2]

Keywords: Forecast · Mathematical model· Spline functions · Surface water quality

Abstract: Mathematical simulations have been started to be used frequently in the simulation and interpretation of environmental phenomena. New approaches in this sense propose a new vision on monitoring (by monitoring meaning taking, analyzing and interpreting the data concerning the environment) the quality of the environment. This paper aims at presenting a study on the quality of surface waters, more precisely about the quality of the water in Suceava River. The analysis will monitor the quality of the waters by using the monitoring system shaping the data obtained with the help of the mathematic apparatus and by using physical and chemical coordinates as quality indicators.

1. The Principles of Mathematical Simulation

We live in a world governed by models. Our consciousness and our own ego are simplified forms of our entire being, that is to say they are models. The life of each one of us is a permanent confrontation between the model of our ego and the model of the surrounding world.

All sciences were born and evolved significantly after models have been elaborated, (Cleine K., 2007). In the mathematical simulation of a process, some general rules have to be followed, such as:

- ⇒ The analysis of similar models taken as a whole. This can lead to an adaptation and improvement of the existing models.
- ⇒ Collecting the necessary information and selecting the information related to those parameters useful to the fixation and the proper understanding of the issue.
- ⇒ Projecting, as a first step, of a simplified model that can be improved later on by adding some details; thus, a flexible model can be obtained.
- ⇒ The analysis of external cases and establishing a hierarchy of the results, sorting the information function of the degree of the impact with the expectation, the evaluation of the results and developing a preview situation are needed.

There can be rarely the case of a perfect situation, especially in case of mathematical simulation of some environmental phenomena, and the projects undergoing mathematical functionality are rarely met. Simulation in environment pollution is considered to be the art of discovery, as well as the art of compromise satisfaction.

When the simulation aims at determining a «positive function» describing the evolution of data in an experiment in order to develop a system or an ecological complex, the mathematic apparatus used is the data switching along with the results given by the numeric analysis; but at the same time, the random processes, physical phenomena and the chaos theory cannot be excluded.

Getting back to the issue of the present study, which is measuring the quality level of the surface water in Suceava River, the mathematical process will be structured on the method specific to the mathematical interpolation and especially the interpolation of splene cubic function.

2. The Mathematical Projection of the Study

Usually, in case of a process analyzed function of the statistic data, the analysis of these data is made in Excel or other specialized software able to present averages, deviations, limit data presentation and anomalies registrations; however, in very few cases this analysis takes into account the inertial evolution of the increase and decrease phenomenon of the parameters in precise time intervals.

We suppose that the process of evolution of the data collected in time is a manageable one, with a continuous C_1 class function. We rely on the information that the evolution of the analyzed parameters cannot have an evolution consisting of sudden increase or decrease.

By interpolation we mean determining the value of an unknown function within a given interval, by using known values at the start and ends of the interval. The fact that the qualitative data collected regard measurements made every two months using the interpolation will allow covering of all the twelve months of a year with interpolative data.

The existence of a function allowing realizing such a model is based on the Weierstrass theorem. This sets the theoretical base of the existence of this function, but does not offer practice criteria of determining the proper function.

Model of surface water quality

Valerian Antohe[1], Constantin Stanciu[1]

Faculty of Engineering from Brăila, Dunărea de Jos University of Galaţi, Romania

Abstract. To predict the variation in Dissolved Oxygen, as well as ammonia concentration in streams, several computer-based mathematical models have been used. How can we control this process using statistical data about, predict, analyze, prevent the critical period, those are some goals for this review.

Keywords: simulate; modeling; predict extreme events; water quality

1 Introduction

Mathematical models in the study of environmental phenomena keep up with the latest results in the mathematical domain which could provide solutions for controlling, analyzing, predicting and study of risk phenomena. Water quality model usually consist of a set of mathematical expressions relating one or more water quality parameters. In any set of environmental measurement, the subjects of accuracy and precision of the measurements are always beneath the surface. Most environmental discharge permits embody normally distributed statistics for environmental events. This is incorrect and rarely realized. Mathematical model of the evolution of the Danube surface water quality parameters and the mathematical accepted structures can help the establishing of a more comprehensive map of risk factors, the imagine of the complex system of Danube River which live like a human entity, permanently monitored, [1].

2 Study area

Study area is located in the terminal of the Danube river basin, in contact with Delta and only 80 km from flowing into the Black Sea. This area is known as Romanian Danube Shipping Sector. Framed in terms of the mathematical modeling, area of study is an imaginary quadrilateral, in latitude of 18 and in longitude by about 1' , around latitude: 45.28 and longitude: 27.97. The evaluation of Danube water quality was conducted in two control locations 183 km and 166 km, which are the entry and exit locations of the river water in Brăila County. From this study, monitored data archive during four years ago (2004-2007) was used. Initial data table was structured and used for data interpolation of each function with twelve values per each year for each monitored element, obtaining time series with a lot of data. These data are confirmed by the real evolution in time.

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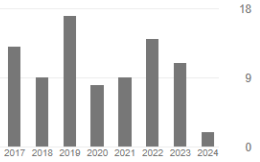

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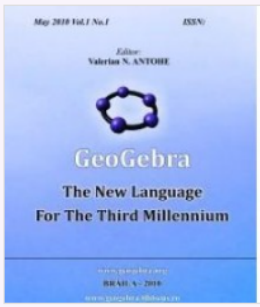

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The geographic space covered with GeoGebra geometry

Ph.D. **Antohe Valerian**
Pedagogical High School "D.P.Perpessicius", Braila, Romania
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Faculty of Economics and Business Administration – "Lower Danube"
University of Galați, Romania

This work has been presented at the GeoGebra International Conference, Budapest, Hungary, 23rd-25th of January 2014

Abstract: *The geographic space offers a great deal of mathematical interpretation, considering this space as one immersed in the Euclidian E3 space or in the E2 Cartesian plane. The support for this attitude could be the GeoGebra-software. The software has made some important steps in order to cover the need of modeling the mathematical space, thus one could accept that any transition could be made towards Geography in order to offer a wider perspective upon the Earth`s spectacle. Even if this geographical environment is represented by maps or stereoscopic images, the connection between Geographical studies, Mathematics and GeoGebra-software in the sense of investigation, becomes more and more accepted today. This study is a window that develops a method of investigation and opens some trends in didactics, focused to GeoGebra.*
Keywords: Geographical space, Mathematical model, GeoGebra-software

1. Introduction: Geographic objects can have many proprieties but from the geographer`s point of view, one of these proprieties plays a special role. This propriety is the location of the object, [Ren65]. Locations are usually defined in a two-dimensional coordinate system, but sometimes this identification is not enough. Nowadays, only by accessing the Google Maps site helps everybody resolve the point with a simple "click" on the map presented on the computer screen. In order to discover the length of a route between two points on a map, especially for a new route, the GeoGebra software will allow us import the 2D map from Google Earth (in jpg format) and go further with the algorithm presented by the authors in 2010. For this, we must find with the help of GeoGebra successive points, defining segments or curves which connect the start point and the end

GeoGebra in the Context of the IT Surrounding Environment and Curriculum, 2010

PhD. Math. **Valerian ANTOHE**
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Abstract: The development of information technology radically changes our way of living, of communicating with the others, of receiving the information. In the future, it is expected that the role of computers in our life become essential; any student will have to master this field in order to achieve easily what he wishes. This presentation covers some ideas that were developed after the first activities carried out under the GeoGebra Institute of Timisoara, Romania, in the eastern part of Romania and our strategies in connection with the development of a broad community of users nationwide.

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