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ANALYZING THE ROLE OF MATRICES IN REAL-WORLD PROBLEM SOLVING

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ABSTRACT

The important role matrices play in solving real-world critical thinking problems in a variety of academic fields. As numerical representations of data and relationships, matrices are essential tools for deciphering and managing intricate systems. Matrix analysis is used in a variety of domains, from software engineering to engineering, such as image processing, network analysis, and problem-solving. Future names for Applied Mathematics include vector variable-based math, discrete mathematics, reconciliation, differential analytics, matrices, and determinants, among others. majority of the time exciting among various point matrices. Straight condition solutions have long been solved with matrices. Matrices are incredibly useful tools that can be employed in a variety of fields. Numerous numerical fields and a few areas of science are affected by matrix mathematics. Everyday life involves the application of engineering mathematics. Every PC-produced image that has a reflection or contortion affect, such as light passing through undulating water, shows the effects of the matrix. Prior to PC architectures, matrices were used in the study of optics to describe refraction and reflection.

Keywords: *Matrices, Real-World, Solving, Determinant, Matrix Mathematics, Engineering Mathematics*

1. INTRODUCTION

A fundamental concept in linear variable-based maths, matrices also play a significant role in real-world critical thinking, transcending disciplinary boundaries and proving invaluable in solving a plethora of puzzling problems. Matrix designs are numerical representations of

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information and connections that provide a flexible framework for addressing and managing confusing frameworks that are investigated in several domains. In rational critical thinking contexts, the meaning of matrices is evident in a wide range of fields, including physical science, engineering, software engineering, finance, and more. The goal of this analysis is to unravel the intricate and necessary role that matrices play in examining the intricacies of real-world problems.

Matrix analysis is used in engineering applications to solve and illustrate difficult frameworks. When it comes to decomposing the fundamental solidity of an extension, optimising energy distribution in a power structure, or simulating liquid elements in advanced plane design, matrices provide a simple and effective way to handle the interdependent variables affecting these structures. Their ability to illustrate the relationships between different boundaries aids in the creation of numerical models that serve as a roadmap for predicting framework behaviour and updating plan arrangements.

Mappings' function seamlessly extends into the field of software engineering, where they facilitate computations and computational approaches essential to image processing, information control, and organisation analysis. Matrices find use in image compression, facial recognition, and artificial intelligence computations, enabling PCs to analyse massive datasets and discern meaningful experiences. Matrix analysis in network analysis aids in the planning of links between hubs, taking into account the differentiating evidence of best practices and vulnerabilities in intricate organisations, ranging from social networks to transportation systems.

Additionally, matrices play a big role in financial difficulties like simplifying and demonstrating. Matrix analysis is used, for instance, in finance to handle resource allocation, risk assessment, and portfolio optimisation. Matrix analysis in task study enhances asset assignment, booking, and operations, enhancing efficiency and containing expenses across various businesses.

As we go more into the role matrices play in practical critical thinking, it becomes clear that their pervasiveness extends beyond only numerical reflections to include the texture of our mechanical and logical headways. This research attempts to dissect the many applications of matrices, demonstrating how they can enhance guidance, streamline computations, and ultimately facilitate critical thinking approaches in a variety of fields. We hope to demonstrate

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the revolutionary impact of matrices in examining the nuances of the cutting edge world through a thorough analysis of contextual analyses and practical applications, establishing them as essential tools for addressing the challenges of the twenty-first century.

2. LITERATURE REVIEW

The APOS (Activity, Cycle, Item, and Composition) hypothesis is presented by Arnon et al. (2014) as a comprehensive framework for both programme evaluation and enhancement in mathematics education. The hypothesis provides a lens through which numerical concepts—particularly those involving logarithmic designs—can be understood and learned. According to the APOS hypothesis, understudies go through distinct mental phases, like as engaging in real-world tasks, conceptualising procedures, creating mental articles, and finally absorbing dynamic diagrams. By using the APOS structure, teachers are able to obtain insight into the thought processes of their understudies, which helps them create more effective teaching strategies and instructional initiatives. The importance of the APOS hypothesis extends to the field of matrices, where effective teaching and learning depend on a knowledge of the transition from substantial operations to extract diagrams.

Babajee (2014) delves deeply into the field of linear polynomial algebra, specifically focusing on direct condition frameworks. The paper compares and contrasts a 2 × 2 Cramer-Disposal technique for solving frameworks with at least three direct conditions with the well-known Cramer's Standard. This investigation essentially evaluates the efficiency, accuracy, and computing complexity of the two methods, providing light on their respective advantages and disadvantages. This kind of research adds valuable information to the subject of mathematical direct variable based arithmetic by providing experts with choice methods for resolving intricate conditional frameworks. The findings offer recommendations for professionals motivated by algorithmic developments as well as for educators hoping to enhance students' understanding of how to comprehend matrix-based critical thinking exercises. The focus then enhances the existing literature on simple polynomial algebraic methods and computing processes by providing a nuanced perspective on the practical applications of these mathematical tools.

In his 2010 paper, Dubinsky explores the educational implications and outcomes of the APOS (Activity, Interaction, Item, and Diagram) hypothesis of mathematical learning. This study examines the practical implications of the APOS system for mathematics education. It was

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introduced during the Eighteenth Yearly Gathering of the Southern African Relationship for Exploration in Mathematics, Science, and Innovation Training. The paper provides examples of how educators might use the APOS hypothesis to design and implement engaging teaching strategies that correspond with the stages of mental development identified by the hypothesis. Dubinsky contributes to the ongoing discussion on creative visualisation approaches by looking at educational applications and presenting findings. This system enhances students' understanding and instruction of numerical concepts, such as those related to matrices and polynomial algebra.

Maharaj's (2014) study delves into the use of APOS hypothesis to dissect the understanding of inherent science that students may interpret incorporation as. The review, which was published in the REDIMAT - Diary of Exploration in Mathematics Schooling, uses the APOS structure to investigate the thought processes related to understudies' acquisition of combination. Maharaj provides a systematic analysis of the understudies' progression through the phases of Activity, Cycle, Item, and Diagram in terms of coordination by using this hypothetical focal point. The findings provide valuable insights into the challenges that students may face and the kinds of instructional frameworks that might be employed to support a deeper and more robust understanding of integration. The APOS theory is expanded upon in this study by focusing on analytics specifically, highlighting its relevance and adaptability to a variety of numerical points and educational contexts.

The African Diary of Exploration in Mathematics, Science, and Innovation Training published Ndlovu and Brijlall's (2015) paper, which examines the psychological changes of concepts in matrix polynomial maths among South African pre-administration educators. This investigation aims to understand the thought processes and challenges that aspiring educators have while trying to help students develop a solid understanding of matrix polynomial algebra. Through an examination of the psychological growth of pre-administration educators, the review adds important information to instructional systems that should enhance matrix polynomial math instruction. This work is important because it offers recommendations for South Africa and sheds light on international efforts in pre-administration teacher education. It also provides insight into the specific nuances of demonstrating the potential of matrix polynomial math ideas.

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Beginning at Concordia College in Montreal, Quebec, Sierpinska, Nnadozie, and Okta's (2002) composition delves into the relationships between hypothetical thinking and high achievement in straight variable based maths. In order to identify instances and linkages between hypothetical reasoning skills and academic success, the review examines the thought processes associated with high proficiency in direct variable arithmetic. By examining these linkages, the investigation broadens our understanding of how to understand the components that enhance proficiency in straight variable-based maths and makes recommendations for instructional strategies and programme designs. The findings are relevant not just for analysts and policymakers seeking to enhance understudy' exposition and calculated reasoning in advanced numerical domains, but also for teachers of straight polynomial maths. By providing observational experiences into the conceptual foundations of outcome in straight variable based maths courses, this study improves the literature that is now available.

3. HISTORY

Between 300 BC and 200 AD, matrices have been used for addressing direct conditions for a very long time. The first example of applying matrix techniques to resolve simultaneous conditions, such as the concept of determinants, is that matrix hypothesis clearly emphasises determinants over matrices, and an independent matrix concept akin to the cutting edge of thought originated only in 1858. The term "matrix" originated with Sylvester, who understood a matrix as an item leading to a number of determinants that are now known as minors. Cayley's Memor is based on the hypothesis of matrices. Although the first mathematical concepts were implemented around 1850 AD, their aims were still applicable at the time. The word matrix means "worm" in Latin. It can also refer, generally speaking, to any location where anything is structured or supplied.

3.1. Application of Matrices

- ❖ In the domain of figures, matrices are used for encryption of messages. They are used in the computation of computations that produce Google page rankings, as well as to create realistic-looking movement on a two-layered PC screen and three-layered realistic images.
- ❖ Matrices play a role in organising unique finger imprint data and are used to pack electronic data.

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- The matrices are essential for using Kirchhoff's Laws of voltage and current to solve the problems.
- Matrix analysis is used to identify and correct errors in electronic communications.
- These matrices play a vital role in computations related to battery power yield estimation and resistor conversion of electrical energy into another usable energy.
- Scientific concepts like exponentials and subsidiary to their higher aspects are conjectured using matrix math.
- A software engineer uses matrices and their opposing matrices to code or encode a message.
- A message is constructed using a double configuration of numbers for correspondence, and it solves using code hypotheses.
- Just these encryptions allow for the operation of online capabilities and the transmission of sensitive and private data, even to banks.
- Matrix analysis is used in topography to provide seismic overviews.
- In nearly all fields, matrices are used for plotting diagrams, measurements, and logical examinations.
- The most effective visualisation methods for charting typical overview items are matrices.
- In financial affairs, matrices are used to compute the gross domestic product, which ultimately aids in efficiently calculating merchandise creation.
- In many associations, matrices are used, for instance, by researchers to record data for their assessments.
- Matrix analysis and computer science provide the foundational knowledge needed to construct robots.
- The computation of matrices lines and sections is used to customise the robot developments.
- The contributions about robot control are provided based on the matrices' estimations.
- Feline outputs and X-ray utilisation matrices in the realm of medicine.
- Matrix analysis is used in physical science to focus on quantum physics, optics, and electrical circuits.
- We can calculate a circuit's electrical parameters, such as voltage, amperage, resistance, and so on, with the help of matrix math.

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- ❖ Matrix mathematics was used in the study of optics to model refraction and reflection.
- ❖ Computers perform Markov reenactments based on stochastic matrices to illustrate events ranging from gambling to weather forecasting to quantum mechanics.
- ❖ Matrix analysis is used to handle real-world data with clear populations, such as the number of people possessing a specific attribute. They can also be used to show population development projections.
- ❖ In several associations, such as for researchers to record the data for their studies, matrices are used to calculate the gross domestic product in financial elements, which finally aids in estimating the merchandise creation productively.
- ❖ Matrix encoding is used for channel covering, stowing away records on display, tent stowing inside pages, incorrect codes, and steganography.
- ❖ Lately, a technique called remote application conventions, which utilises matrices for transcription, has been used for remote web associations via cell phones.
- ❖ Matrix analysis is also used in cryptography, which is the study of data security. These developments hide or transport data.
- ❖ These are the most effective ways of depicting the typical high-level elements.
- ❖ The page rank calculations that determine a website's placement in Google search make use of stochastic matrices and Eigen vector solvers.

3.2. Matrices-Application to Cryptography

The fundamental idea behind cryptography is that information can be encrypted using a plot and decrypted by anyone who is aware of the scheme. There are several encryption plans available, ranging from very simple to quite complex. Most of them have a numerical component to them.

Sensitive information is routinely transmitted via the Internet these days, including credit card numbers, personal information, ledger numbers, letters of credit, passwords for important databases, and so forth. That data is often encrypted or jumbled.

The decoder is a matrix that has been reversed by the encoder. Assume that A is the encoding matrix, M is the message matrix, and X is the scrambled matrix. The size of X will be determined by the dependability of the extents of An and M. At that moment, in terms of numbers, the activity is

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$$AM = X \qquad (1)$$

Someone needs to retrieve M, the initial message, and they have X and know A. That would be the same as figuring out M's matrix condition. Replicating the two sides, we have 1 of the scenario represented by A on the left.

$$M = A^{-1}X \qquad (2)$$

Example: Let A=1, B=2, C=3, and so on,

Allow 0 to address a clear. Allow 0 to address a clear. The message "THE Eagle HAS LANDED" needs to be encoded. Our goal is to convert a letter's meaning into a number. Making use of the summary above, the message turns into:

20, 8, 5, 0, 5, 1, 7, 12, 5, 0, 8, 1, 19, 0, 12, 1, 14, 4, 5, 4

We must now choose a coding matrix.

$$A = \begin{bmatrix} 3 & 0 & 1 & 1 \\ 1 & 2 & 5 & 0 \\ 1 & 1 & 3 & 0 \\ 2 & 0 & 1 & 1 \end{bmatrix} \qquad (3)$$

There are only four numbers that we can encode at once because this matrix is 4 x 4. The message is divided into four-number chunks, with spaces added where necessary. There are 20, 8, 5, and 0 people in the main group. There will be a 4 x 1 message grid.

$$\begin{bmatrix} 3 & 0 & 1 & 1 \\ 1 & 2 & 5 & 0 \\ 1 & 1 & 3 & 0 \\ 2 & 0 & 1 & 1 \end{bmatrix} \begin{bmatrix} 20 \\ 8 \\ 5 \\ 0 \end{bmatrix} = \begin{bmatrix} 65 \\ 61 \\ 43 \\ 45 \end{bmatrix} \qquad (4)$$

Thus, 65, 61, 43, and 45 are the first four encrypted numbers.

The next four encrypted digits are 1, 7, 12, and 5.

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$$\begin{bmatrix} 3 & 0 & 1 & 1 \\ 1 & 2 & 5 & 0 \\ 1 & 1 & 3 & 0 \\ 2 & 0 & 1 & 1 \end{bmatrix} \begin{bmatrix} 5 \\ 1 \\ 7 \\ 12 \end{bmatrix} = \begin{bmatrix} 34 \\ 42 \\ 27 \\ 29 \end{bmatrix} \quad (5)$$

The next four groups are 34, 42, 27, and 29. Take note of the fact that 5 came out as 43 in the primary group but 34 in the second one. One advantage of the matrix conspire is that. Finding an example can be challenging because same information can be encoded in different ways.

We get the jumbled message when we encrypt the entire arrangement:

65, 61, 43, 45, 34, 42, 27, 29, 24, 45, 29, 19, 70, 79, 55, 51, 51, 47, 33, 37

Let's use the inverse matrix to decode it.

$$A^{-1} = \begin{bmatrix} 1 & 0 & 0 & -1 \\ 2 & 3 & -5 & -2 \\ -1 & -1 & 2 & 1 \\ -1 & 1 & -2 & 2 \end{bmatrix} \quad (6)$$

Interpreting the first four digits, we have

$$\begin{bmatrix} 1 & 0 & 0 & -1 \\ 2 & 3 & -5 & -2 \\ -1 & -1 & 2 & 1 \\ -1 & 1 & -2 & 2 \end{bmatrix} \begin{bmatrix} 65 \\ 61 \\ 43 \\ 45 \end{bmatrix} = \begin{bmatrix} 20 \\ 8 \\ 5 \\ 0 \end{bmatrix} \quad (7)$$

The first four digits decode as the first four digits in the original message.

There are several other plans besides matrix encryption. The Public Safety Organisation, the armed forces, and private alliances all regularly hire a large number of people to create new strategies and unravel old ones.

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4. METHODS FOR SOLVING A SYSTEM OF LINEAR EQUATIONS USING MATRICES

An analysis of some of the recommended books and examination articles was completed in order to determine the methods for solving a set of straight conditions using matrices that college students should be introduced to in a prologue to direct variable-based maths. That study found three ways to use matrix strategies to settle a collection of direct conditions. These are the following:

The echelon structure is pushed by the line decrease approach of the enhanced matrix portrayal. This approach might be applied to any configuration of parameters. There is no requirement that the number of criteria equal the number of elements. Tasks are applied to the columns of the expanded matrix, changing the underlying framework to an identical framework with an enlarged matrix in a line echelon structure. Given the similarity of the frameworks, their response is rather similar. Thus, the line echelon structure that appeared could be used to handle the same set of situations, and adjustments could then be made. The framework may have a remarkable arrangement, an infinite arrangement, or no arrangement at all.

using the coefficient matrix's reverse to solve a set of linear conditions whose matrix representation is given by the formula AX=C. When the number of direct conditions in the framework equals the number of components and the coefficient matrix's converse is present, this technique must be used. The square matrix An, obtained from the factor coefficients, is represented by the matrix AX=C. The segment matrix C, which indicates the constants to one side of the equivalent to sign when the conditions are written in standard structure, is represented by the matrix X, which represents the factors. The idea is to increase by reversing matrix A, A-1, from the left throughout the scenario. A - 1 AX=A-1C X=A-1C, thus AX=C. A† .Next, matrix augmentation is applied to arrive at the unique solution for the framework

The Cramers Standard. Let AX=C be the matrix representation of a set of n straight conditions in n components, where the coefficient matrix is non-singular. The structure then has an intriguing arrangement provided by

$$\boldsymbol{x_1} = \frac{\boldsymbol{det(A_1)}}{\boldsymbol{det(A)}}, \boldsymbol{x_2} = \frac{\boldsymbol{det(A_2)}}{\boldsymbol{det(A)}}, \boldsymbol{x_3} = \frac{\boldsymbol{det(A_3)}}{\boldsymbol{det(A)}}, \dots, \boldsymbol{x_n} = \frac{\boldsymbol{det(A_n)}}{\boldsymbol{det(A)}} \qquad (8)$$

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where A1 is the matrix obtained from A by substituting the specific sections of the segment matrix C for the passages in the ith segment of A.

It should be noted that the vocabulary used to describe the aforementioned techniques (such as expanded matrix, column tasks, and line echelon structure) and the use of imagery contribute to what Britton and Henderson (2009) refer to as the deterrent of formalism subject that exacerbates students' problems.

5. CONCLUSION

The evaluation of matrices' role in practical critical thinking has revealed their revolutionary and inescapable impact in a variety of fields. As powerful numerical tools, matrices have demonstrated their versatility in illustrating intricate structures, streamlining computations, and enhancing dynamic cycles. Matrix analysis provides a common language for addressing relationships and improving arrangements in real-world applications, ranging from software engineering and engineering to financial matters and beyond. The study of matrices is not limited to easily understood numerical norms; rather, it is deeply entwined with the fabric of novel discoveries and rational progress. By means of a comprehensive analysis of several contextual studies, this inquiry has brought to light the critical concept of matrices in addressing the bewildering challenges of the contemporary world. The role of matrices in critical thinking continues to be a proof of their getting through importance and utility in setting the direction of logical and mechanical development as we explore a time depicted by expanding intricacy and interconnectedness. Matrix utilisation extends beyond transcription, cryptography, and diagram hypothesis. However, these days, practically every branch of engineering research, finance, banking, military, organisation, classified messaging, transducer, automated storage facilities, and so on uses it. A portion of creative effort is still anticipated in this recorded.

REFERENCES

1. *Arnon I, Cottrill J, Dubinsky E, Oktac A, Fuentes SR, Trigueros M, Weller K 2014. APOS Theory A Framework for Research and Curriculum Development in Mathematics Education. New York: Springer.*
2. *Babajee DKR 2014. A Comparison between Cramer's Rule and a Proposed 2 × 2 Cramer-Elimination Method to Solve Systems of Three or More Linear Equations. From (Retrieved on 20 February 2015).*

ISSN:2320-3714
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Impact Factor: 10.1
Subject: Mathematics

3. *Barmby P, Harries T, Higgins S, Suggate J 2007. How Can We Assess Mathematical Understanding? From (Retrieved on 6 August 2013).*
4. *Britton S, Henderson J 2009. Linear algebra revisited: An attempt to understand students' conceptual difficulties. International Journal of Mathematical Education in Science and Technology, 4(7): 963-974.*
5. *Dorier JL, Sierpinska A 2001. Research into the teaching and learning of linear algebra. In: D Holton, M Artigue, U Krichgraber, J Hillel, M Niss, A Schoenfeld (Eds.): The Teaching and Learning of Mathematics at University Level: An ICMI Study. Dordrecht, Netherlands: Kluwer Academic Publishers, pp. 255-273.*
6. *Dubinsky E 2010. The APOS theory of Learning Mathematics: Pedagogical Applications and Results. Paper presented at the Eighteenth Annual Meeting of the Southern African Association for Research in Mathematics, Science and Technology Education. Durban, South Africa. 18-21 January.*
7. *Maharaj A 2014. An APOS analysis of natural science students' understanding of integration. REDIMAT – Journal of Research in Mathematics Education, 3(1): 53-72.*
8. *Maharaj A 2015. A framework to gauge mathematical understanding: A case study on linear algebra concepts. International Journal of Educational Sciences, 11(2): 144-153.*
9. *Ndlovu ZA, Brijlall D 2015. Pre-service teachers' mental constructions of concepts in matrix algebra: A South African case. African Journal of Research in Mathematics, Science and Technology Education, 19(2): 156-171.*
10. *Sierpinska A, Nnadozie A, Okta A 2002. A Study of Relationships between Theoretical Thinking and High Achievement in Linear Algebra. Manuscript. Montreal, Quebec: Concordia University*
11. *Stewart S, Thomas M 2009. Linear Algebra Snapshots through APOS and Embodied, Symbolic and Formal Worlds of Mathematical Thinking. From (Retrieved on 11 November 2013).*
12. *Stylianides AJ, Stylianides GJ 2007. Learning Mathematics with Understanding: A Critical Consideration of the Learning Principle in the Principles and Standards for School Mathematics. From (Retrieved on 6 August 2013).*
13. *Tan ST 2014. Applied Calculus for Managerial, Life and Social Sciences. 9th Edition. United States: Brooks/Cole.*

ISSN: 2320-3714
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Impact Factor: 10.1
Subject: Mathematics

14. *Weller K, Arnon I, Dubinsky E 2009. Pre-service teachers' understanding of the relation between a fraction or integer and its decimal expansion. Canadian Journal of Science, Mathematics and Technology Education, 9(1): 5-28.*

15. *Zaslavsky O, Shir K 2005. Students' conceptions of a mathematical definition. Journal for Research in Mathematics Education, 36(4): 317–346.*

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