CERTIFICATE
OF APPRECIATION

3755/Un.08/FTK/PP.00.9/5/2024

This certificate is proudly presented to

Dr.Mahdalena,S.Pd, M.Pd

as Presenter at

The 1st International Conference

"The Application of Artificial Intelligence Technology in Math and Physics Learning"

held by Mathematics Education and Physics Education Department
Faculty of Tarbiyah and Teacher Training
UIN Ar-Raniry Banda Aceh
May 14 - 15, 2024

Banda Aceh, May 15, 2024

KEMENTERIAN AGAMA REPUBLIK INDONESIA
FAKULTAS TARBIYAH DAN KEGURUAN UIN AR-RANIRY BANDA ACEH

Prof. Safrul Muluk, S.Ag., M.A., M.Ed., Ph.D
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UIN Ar-Raniry Banda Aceh

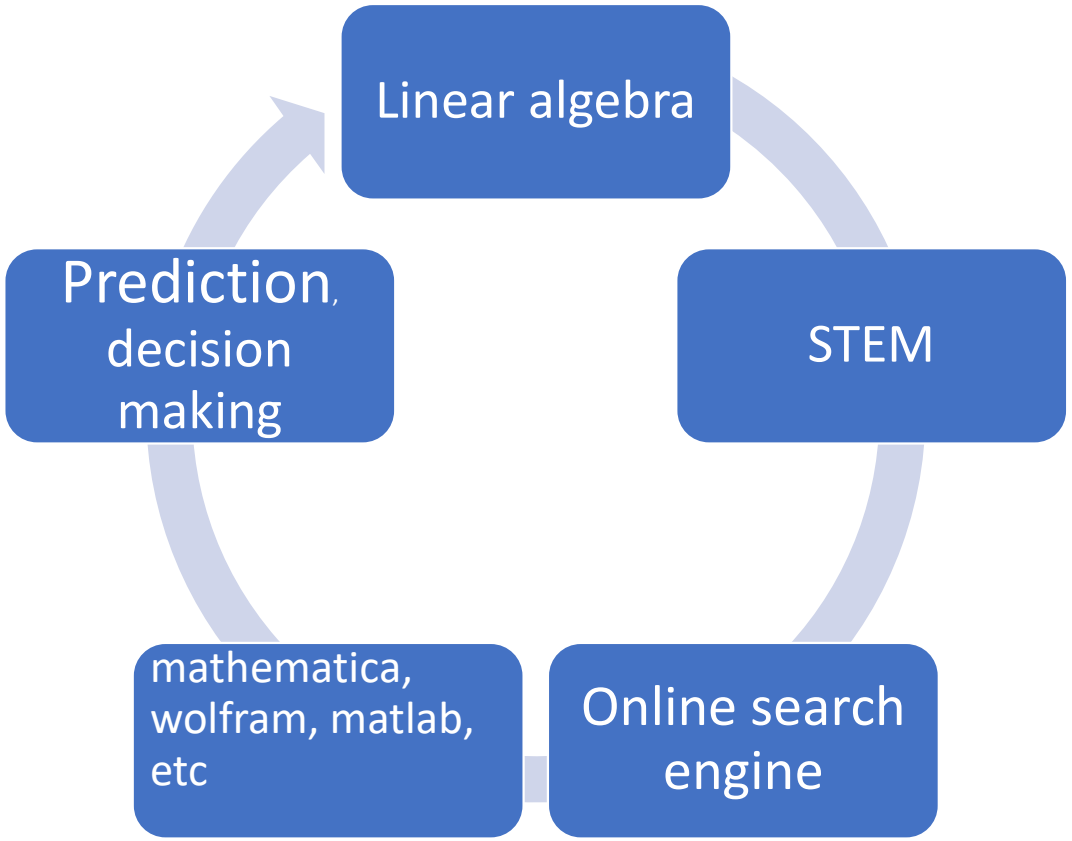
The 1st International Conference on Mathematics, and Physics Education 2024

Using Wolfram Alpha for Assistance in the Learning of Linear Algebra

Dr. Mahdalena, S.Pd, M.Pd

IAIN LHOKSEUMAWE

Introduction



Theoretical framework

1. https://www.wolframalpha.com/
2. Linear Algebra
3. Matrix Multiplication
4. Determinant
5. Systems of Linear Equations
6. Linear Independence and dependence

Method

Literature Study

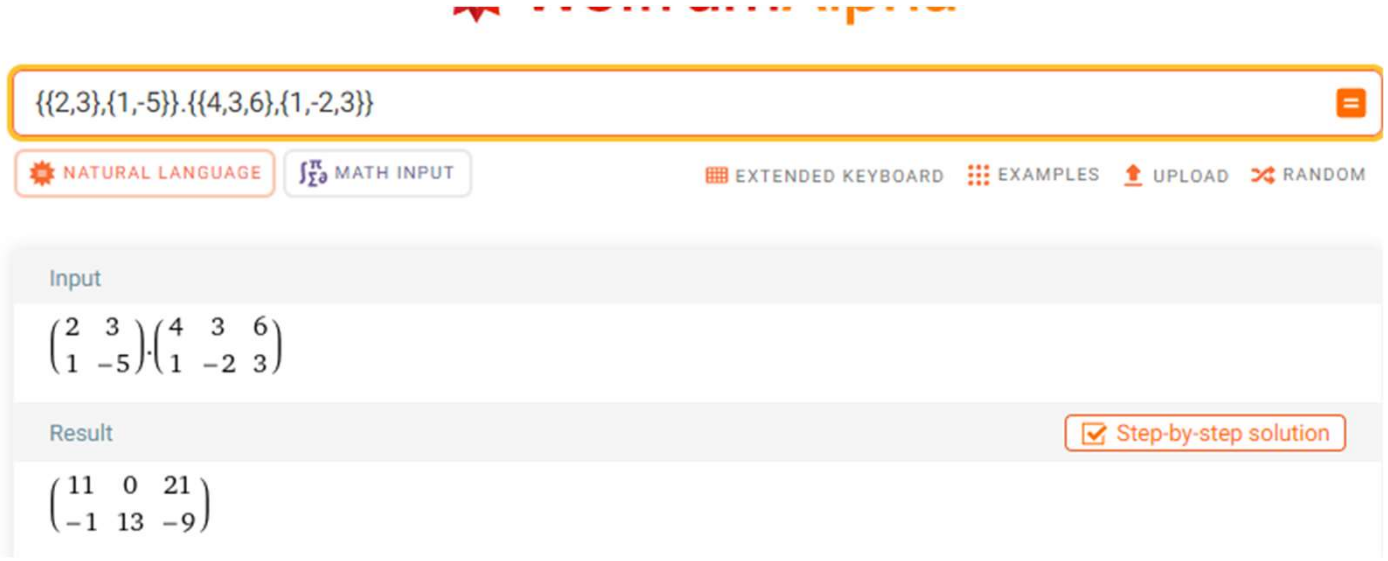
Data

1. David et al, Linear Algebra and its Application, 2016, Pearson Education, USA
2. Mark J.DeBonis , Introduction to Linear Algebra (Computation, Application and Theory), 2022, Taylor and Francis Group
3. Shou-Te Chang, Advanced Linear Algebra (With an Introduction to Module Theory), 2023, Singapore: Word Scientific Publishing

Result and discussion

1. Matrix Multiplication

Compute AB, where A= $\begin{pmatrix} 2 & 3 \\ 1 & -5 \end{pmatrix}$ and B = $\begin{pmatrix} 4 & 3 & 6 \\ 1 & -2 & 3 \end{pmatrix}$



2. **Calculate the determinant of**

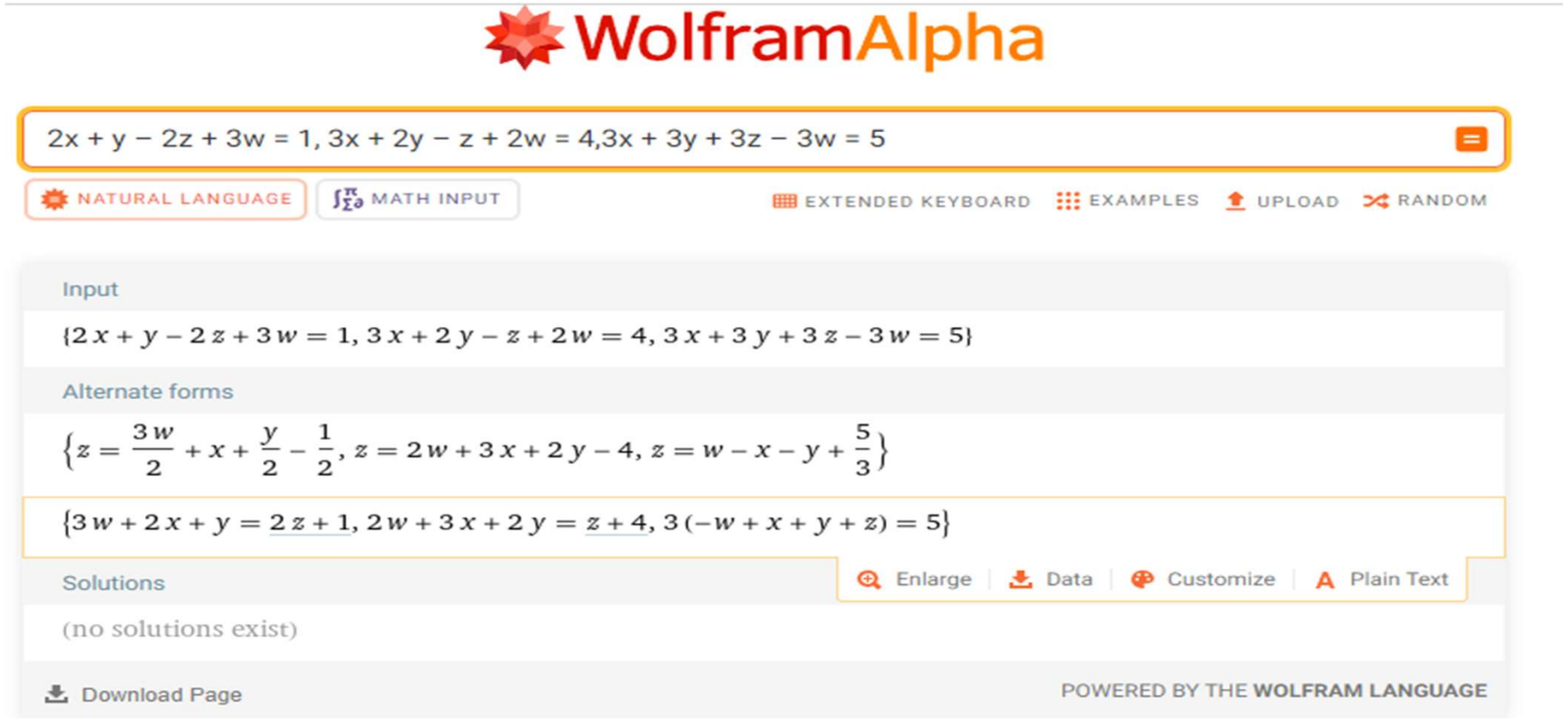
$$\begin{bmatrix} 1 & 2 & -1 & 3 \\ 0 & 1 & 4 & 2 \\ 0 & 1 & 0 & 4 \\ 1 & 0 & 2 & 1 \end{bmatrix}$$

3. Solve the linear system

$$2x + y - 2z + 3w = 1$$
$$3x + 2y - z + 2w = 4$$
$$3x + 3y + 3z - 3w = 5$$

Input: $2x + y - 2z + 3w = 1, 3x + 2y - z + 2w = 4, 3x + 3y + 3z - 3w = 5$

Ouput:



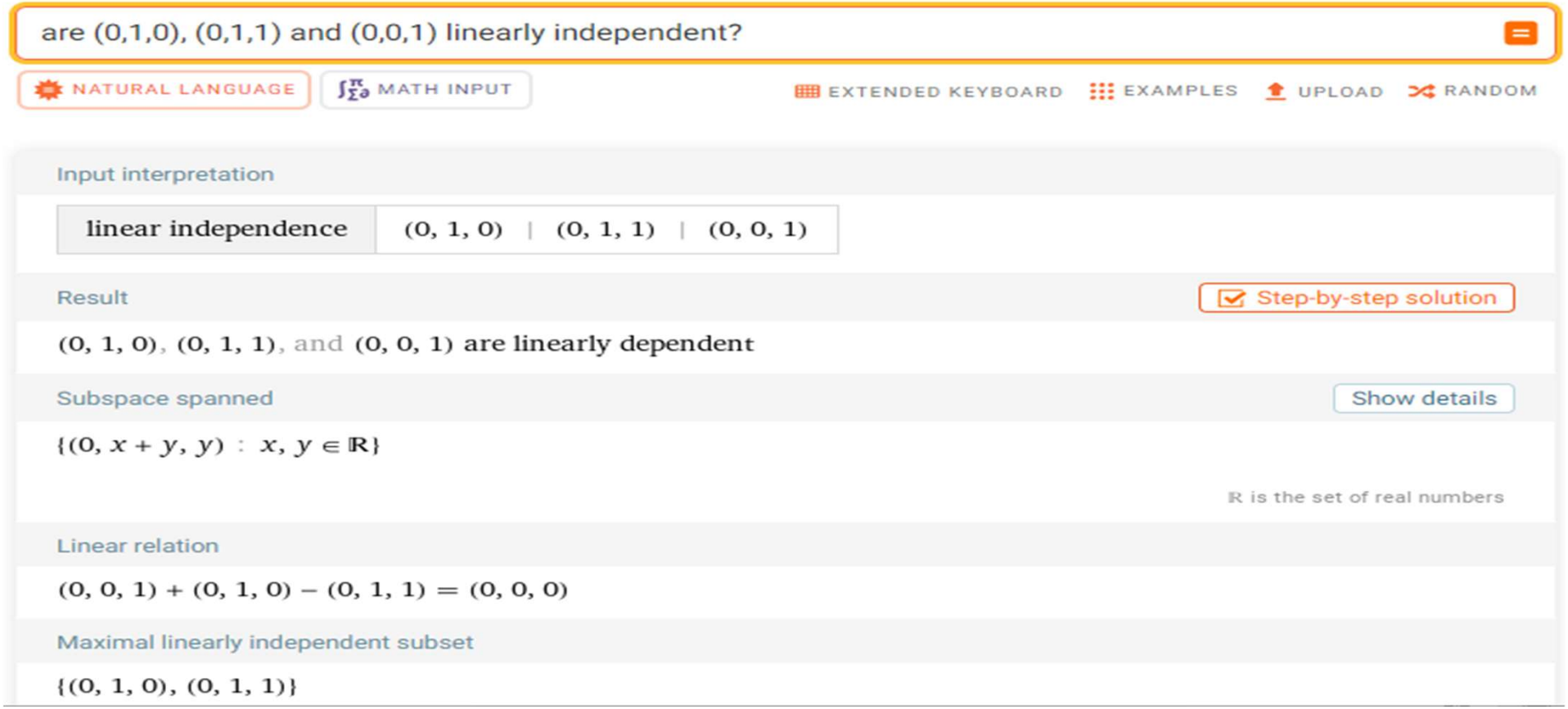
4. Linear Independence and dependence

Let E be the set of vectors

E = {(0,1,0, (0,1,1), (0,0,1)}

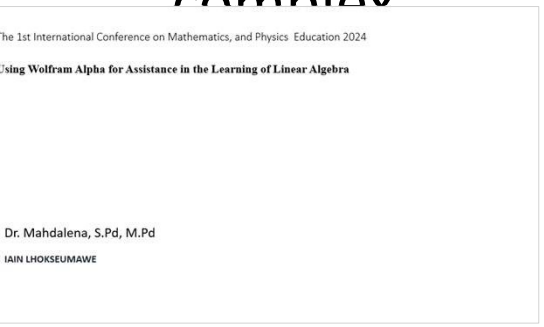
In R^3 . Then E is a linearly dependent set of vectors because

1(0,1,0) +1 (0,0,1) + (-1)(0,1,1) = (0,0,0)



Conclusion

Wolfram Alpha is relatively easy to use and very effective in helping understanding and solving algebraic problems, both simple and complex



Artificial intelligence (AI) technologies have made significant strides in the past ten years in handling challenging problems. Two areas of particular success have been computer vision and the creation of autonomous agents. At the moment, numerous facets of mathematical activity and mathematics education are beginning to include contemporary AI technology. One of the mathematics education curriculum's courses (MK) is linear algebra; since MK is applied widely in many different fields, it is crucial that MK learning be taught using AI applications. One such application is Wolfram Alpha (WA), which is fairly well-known due to its easy Google accessibility. As an example, let's say one of the topics is systems of linear equations (SPL), where each SPL can have exactly one solution, no solutions, or an infinite number of solutions. Any of the m linear equation systems with n unknown components in it Using OBE (elementary row operations), the solution can be found. Naturally, using WA would be a more intriguing method to determine whether the SPL has a solution or not, in addition to OBE. The purpose of this study is to describe the application of WA in various MK subjects related to linear algebra. An arbitrary system of m linear equations with n unknown variables OBE can be used to determine the solution. Naturally, WA would be a more intriguing method to determine whether the SPL has a solution than OBE.

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