"Interval and Fuzzy System of Linear Equations in Real Life"

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ABSTRACT

In the project, there is a brief discussion about the uses of fuzzy systems and linear equations in real life is given. With the help of these types of equations, one will be able to understand the uses of fuzzy systems and linear equations. There are so many uses of fuzzy systems that can be observed already and in the future, the uses of it will increase. That is why researchers are trying to search for more methods that will help to solve many more fuzzy problems. That is why it is necessary to increase the knowledge about it. Fuzzy systems in linear equations are used for solutions in mathematics, physics, and many more. It can be used in the solution to know the unknown age, unknown time, distance, pressure, distance, and many more. To solve these problems there are also many methods available for this which are very important. Linear equations have helped a lot to solve many relationships between many other variables that can be related to physical variables, calculate rates and make more conversions. Some of the very important linear equations are as substitution method, linear combination or addition method, matrix method, and graphing method. These all are some of the most used and also very essential methods. Fuzzy systems are divided into many parts too which are an inference engine, a defuzzifier, a fuzzier, and a type that is based on knowledge. These all are discussed in this paper as these are used so many in real life.

Introduction

Linear equations have many applications in various fields such as in pelagic research, material science, human science, structuring, and many more. It is a very useful branch of science. When it is used in the arrangement of some new numbers it becomes straightforward or direct forward. The variables of this type of equation are fluffy numbers or intervals. It can be used to check the length of something. It can be used to calculate distance, time, or speed. It has also a huge application in geometry-related problems and can be used for percentage-related problems and in the calculation of money. In real life, it has many uses that are also very important like in the calculation of mileage rates, figuring outcomes in a particular time, and in the predictions of many problems. In real life, it can help to find unknown ages, and geometrical angles help to solve the problems that are related to pressure and force. Linear equations can be of many types such as one variable, or two variables. Fuzzy linear equations have so many uses in real life

therefore it can be said that it is very important and will have many uses. In the future, it will have more uses.

Review of literature

According to Ontiveros-Robles *et al.* 2020, fuzzy logics are one of the most used methods nowadays and is also used in many alternative methods for better procedure. Type 2 fuzzy logic can be used for the improvements of many applications of many processes. However, it can be also applied to analyze the importance of the method to control performance. It helps to make the performance netter of linear equations and also helps in the development of its use in real life. In real life, it has much use and that is why it is being used so much. It can be used to measure the absolute error for integral time-weighted, absolute error for performance error, and other metrics reports. It has so many uses and with the implementation of fuzzy logic, it has become easier to solve many problems. There are many fuzzy systems are available that can solve many academic problems along with many real-life problems.
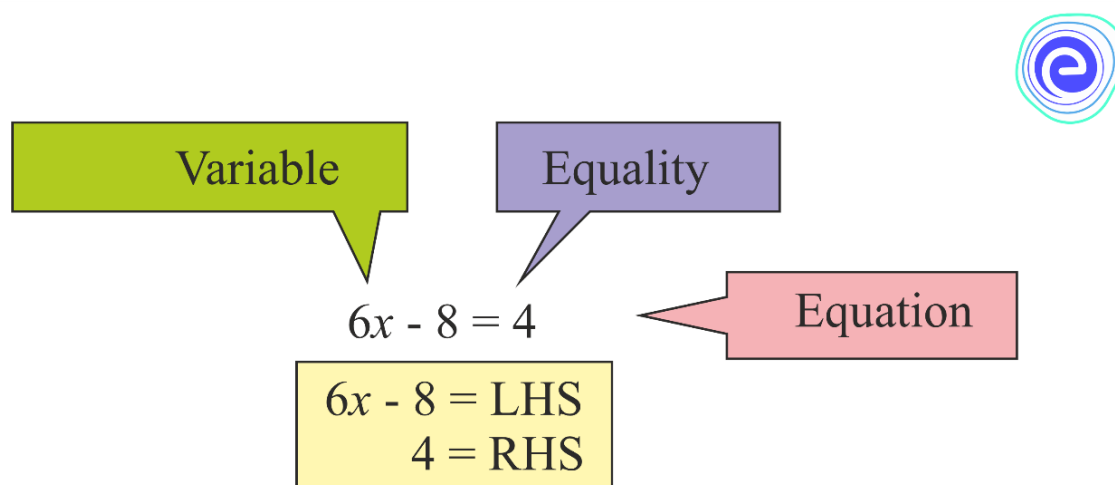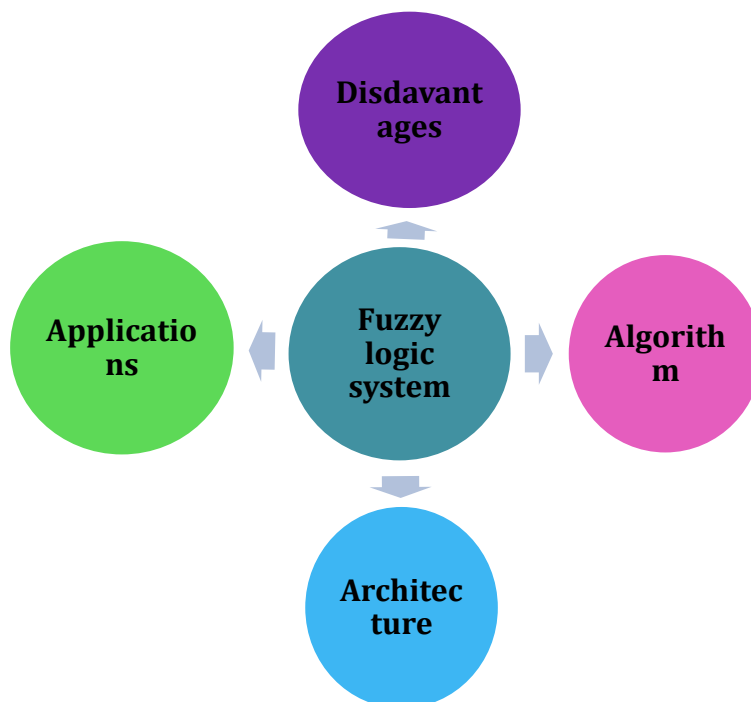

Figure 1: Application of linear equation
(Source: https://www.embibe.com/exams/applications-of-linear-equations/)

According to Bharati & S. K. 2022, the problems that are related to the interval-based fuzzy sets are able to solve lots of hesitation and uncertainty problems that can be found in engineering, many industrial sectors, and agriculture. These problems are normally called PPP or problems that are for production planning. In this journal, there is an idea about multiobjective problems is given. In this journal, many methods have been suggested that can help in the solution of many linear problems. There is a description of optimization problems that can be used for the development of fuzzy linear programs. Apart from that many computational programs are also available that can help to reduce the problems of linear fuzzy problems. Multiobjective linear programming problems are also can be for this purpose as these all methods are very effective.

With the help of these methods, it will be easier to solve many real-life problems like solving unknown age, pressure, and many other problems. In this journal, it is said that linear fuzzy problems are very important and are able to solve many problems which is why it is very important.

Figure 2: Fuzzy logic application
(Source: Self-created on MS Word)

Materials and methodology

There are many methods that can be used for the solution of linear equations. There are three possible methods with the help of which linear equations can be solved which are one point, zero point, and infinitely many points. There are also some different methods available for the solution of linear equations which are the substitution method, graphing method, matrix method, and linear combination method. Though linear combinations method is also known as the elimination method or addition method (Riaz *et al.* 2019). These all are very important methods for the solution of linear equations and solving linear equations are necessary because it will help to solve many real-life problems. The fuzzy system can be used in many equations and it has so many uses and for that reason to solve these systems, there are also so many methods that can be seen. These methods are also very important as they are used in many fields.

Zero solutions:

$$y = -2x + 4$$
$$y = -2x - 3$$
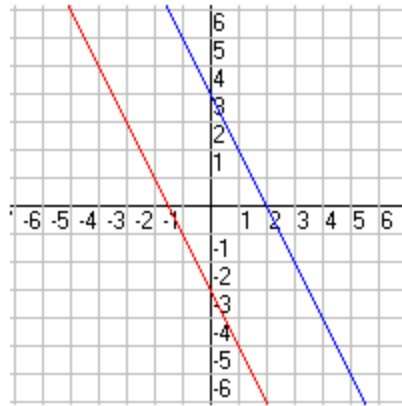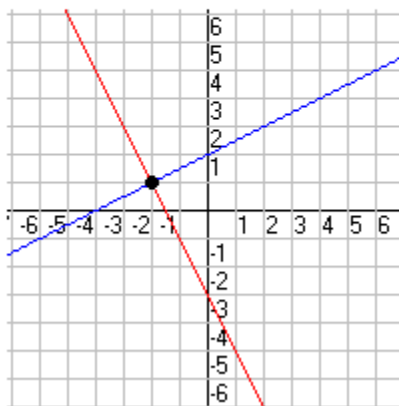

Figure 3: Intersect through Zero point

(Source: https://www.varsitytutors.org)

The method that is used for the solution of zero points is used for parallel while the method that can intersect at one point is used in most cases. All these methods are very important to solve linear equations.

One solution:

$$y = 0.5x + 2$$
$$y = -2x - 3$$

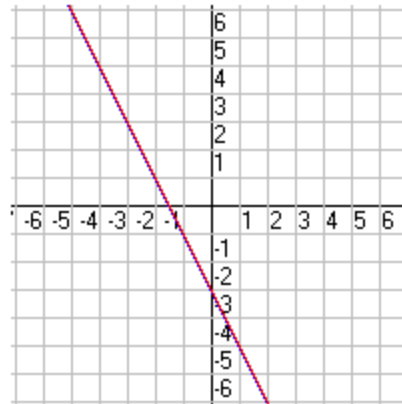**Figure 4: Intersect through one point**

(Source: https://www.varsitytutors.net)

The method for many points is used to solve two equations at the same line. Therefore all of these equations are very necessary for the solutions of linear equations-related problems.

Infinitely many solutions:

$$y = -2x - 4$$
$$y + 4 = -2x$$

Figure 5: Intersect through many points

(Source: https://www.varsitytutors.net)

Linear equations are used for the solution of linear equations that can be two or more equations. Fuzzy systems in linear equations can help in many areas such as physics, statics, engineering, social science, operational research, and economics. It helps to solve many real-life related problems (Hannan *et al.* 2019). A fuzzy system in linear equations is where the coefficients of a system are fuzzy numbers, in short, it is also called FFLS or Fully Fuzzy Linear System. Fuzzy equations can be solved by a method which is known as an alpha cut. Fuzzy logic can help to deal with much information that are arising from computational cognition and perception.

Results and discussion

Fuzzy problems are known as FFLP problems which also have two categories. The categories are FFLP problems with constraints of equality and FFLP problems with constraints of inequality. Linear equations are also very important and have so many uses (Wu *et al.* 2019). Fuzzy systems are used to solve multiple problems and many more methods can be used for the solution of the problems.
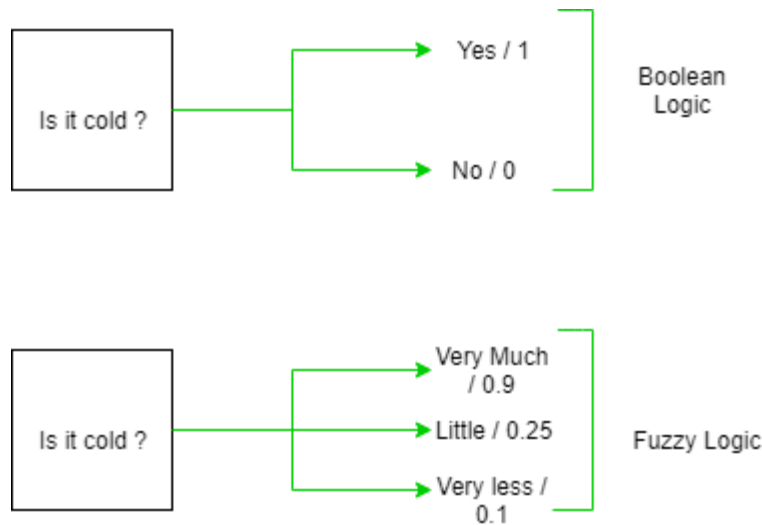
Figure 6: Fuzzy logic

(Source: https://media.geeksforgeeks.net)

There are many fuzzy logics that can be used for the solutions of linear equations. Not only in linear equations but also for many other problems it can be used for the solution of the problems. In the adobe picture, there is an example of a fuzzy system given, which can help to understand the method that is used to solve linear equations.
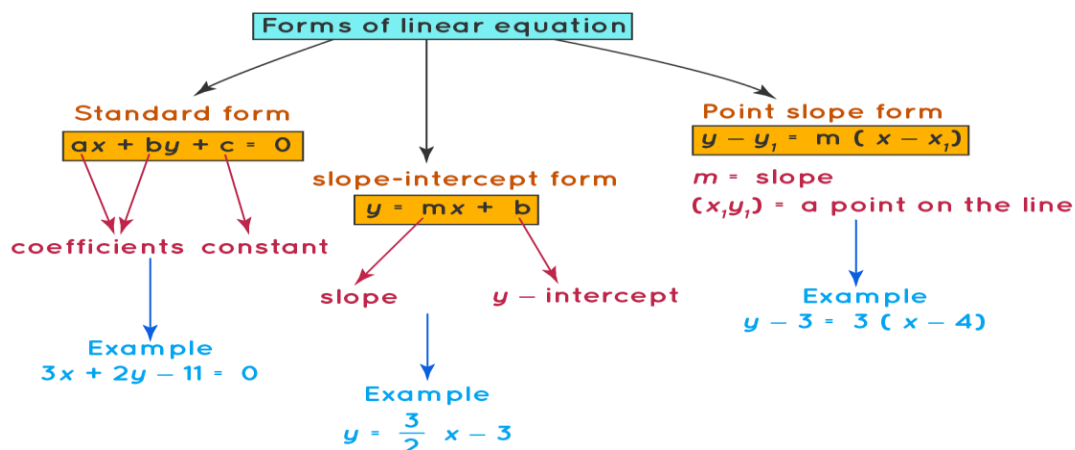
Figure 7: Use of Linear equations

(Source: https://d138zd1ktt9iqe.cloudfront.net)

In the above picture, there is an example given to explain the use of linear equations to solve two variables. These methods are very important to solve linear problems which is why these are very important. There are more equations available that are similar to this and also help in the solution of the problems that are related to real life.

Conclusion and future scope

Conclusion

There is also much importance of linear fuzzy problems that can be observed. There are also many methods available for this purpose that can help in the development of this. With the help of. Linear equations are of many types such as slope-intercept variation, direct variation, point-slope form, and standard form. These all methods are very important as with their help of them it is possible to solve many problems that are related to real life. To solve these equations there are also many types of methods are available. With the help of fuzzy systems, it is possible to describe many situations in which many data and statistical data or equations are provided. Fuzzy sets help to solve many critical problems that are hard to solve by any normal procedure. These can be used for the solution of many Cartesian products of fuzzy sets. Therefore it can be easily said that with the help of fuzzy sets and linear equation it is possible to solve many critical problems that are related to real life. It has so many uses in mathematics, finding unknown aged, distances, time, and speed, problems that are related to pressure, and force, and solving unknown problems. In these cases linear as well as fuzzy systems also help a lot to find the solution.

Future scope

In the future, there will be more need for a fuzzy system as it has the ability to solve many critical problems. Linear equations are able to solve many problems and will have many more uses. In the future, it will have more uses and implementation in the fields of mathematics, geometry, and more problems that are related to real life. Fuzzy logic is also very important and also will have so many uses as these are very important. These have the ability to solve many critical problems and also help to solve many engineering problems that are related to many real-life problems. Fuzzy problems are ankle to solve many uncertain non-linear problems too. It has the ability to solve many more problems (Eyoh *et al*. 2018). It takes the help of many data and equations to solve many critical problems. There are also many linear problems available that can be solved with only fuzzy systems, therefore, it can be said that fuzzy systems are very important, and in the future, they will have more implementations to solve many problems. These have so many implementations yet many people are unaware of the uses of fuzzy systems. That is why it is necessary to spread knowledge about interval and fuzzy systems among normal people. Then more people will be able to solve many more things. Since it has so many uses as it will be better to get the knowledge about this.

Recommendation

The linear fuzzy equation will have many more uses in the future as there are more implementations will be necessary for this. It can solve many age-related problems and it will have more uses in the future. Linear equations are very important as they can be used in many fields in the real life too. Linear equations are used to describe two variables and they can help ti

calculate the two variables. On the other hand, a fuzzy system is also very important and also provides so many advantages such as it is a system where no inputs are required, it can be used to accommodate several types of inputs, it can help in the measurement of many data, and can help to stop working in for the feedback sensor, and can reprogram if the situation required (Hamamoto *et al*. 2018). The fuzzy systems can accommodate many types of data for the better output of the program so when it is used for linear equations then many problems can be solved with the help of this. Linear equations are also very important and it has so many uses. In the future there will be more uses of fuzzy linear equations can be observed as it has many implementations.

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Appendices
Appendix 1: Application of linear equation in real life

(Source: https://wittysparks.com/linear-equations-in-real-life-examples/)
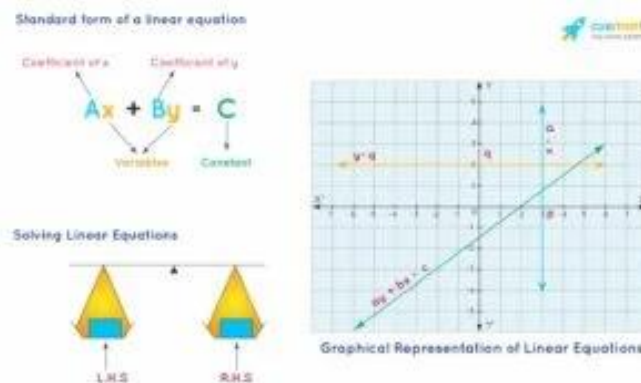
Appendix 2: Fuzzy logic system

doesn't have certain boundaries like human logic.

Figure 2

(Source: https://www.semanticscholar.net)