

# The Relationship Between a Linear Equations System of COVID-19 and the Faithfulness to Allah SWT

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## Abstract

*In Islam, mathematics can be used and applied in worship and muamalah. One of them is a system of linear equations. The Corona Virus Disease pandemic or better known as the COVID-19 is a disease that still be pandemic in every country. A person's devotion of Allah SWT can be influenced by an event. In this study, we will present the relationship between system of linear equations in the COVID-19 case and person's devotion of Allah SWT. Using exponential functions of linear equation system which describes the number of victims exposed to COVID-19, we will show that the higher the number of victims exposed to COVID-19 outbreak from day to day, it will increase one's devotion to Allah SWT. And the lower the number of victims exposed to COVID-19 outbreak from day to day, all people must not be careless and continue to increase their devotion to Allah SWT.*

**Keywords:** exponential functions, COVID-19, devotion, system of linear equations.

## Introduction

Mathematics is a value-free basic science that studies the abstraction of space, time and numbers. Mathematics can be a benchmark for the development of science and technology. Mathematics provides the ability to think logically in solving problems. Mathematics itself is divided into several fields, namely the concentration of analysis, applied, algebra and statistics. However, the four of them are related to each other. Mathematics pours its concepts and theories in the form of numbers and symbols to describe the reality of the universe. In addition, mathematics can also be connected in the religious field.

In Islam, mathematics has been used and applied in matters of worship and muamalah. In addition, mathematics can be used as an object to reflect on Allah and increase our piety to Allah by taking lessons from the theorems and concepts being studied.

The pandemic of Corona Virus Disease or better known as the COVID-19 is a disease that still be pandemic in every country so that people are worried about this situation with their respective levels of vulnerability. However, as a Muslim, one should remain patient and *husnudhon* (good prejudice) because from this incident there will be wisdom that can be used as a lesson.

In this article, the author will discuss the relationship between a system of linear equations in the

development of the COVID-19 pandemic to increase the piety to Allah.

## Research Method

The method was used by the study of literature with various sources such as books, websites, journals and previous studies that are still related to the system of linear equations and person's devotion to Allah SWT. So that the author can find out and collect information, data, theoretical concepts and references needed in conducting this research, namely examining the relationship between a linear equation system in the development of the COVID-19 virus case and one's devotion to Allah SWT. The study begins by analyzing the system of linear equations in the case of the COVID-19 virus in Indonesia and examining research and information about a person's devotion to Allah SWT. After that, a study was conducted on the relationship between the linear equation system in the development of the COVID-19 pandemic to increase piety to Allah.

## Results and Discussion

### Definition and Concept of Linear Equations System

A linear equation is one kind of the algebraic equations, where each term has or contains a constant, or the

product of a constant with a single variable to the power of one. This equation is said to be linear because this mathematical relationship can be described as a straight line in the Cartesian coordinate system. (Safitri, 2021)

The general form for a linear equation is:

$$y = mx + C$$

In the above equation it can be seen that the constant describes the gradient of the line, and the constant is the point where the line intersects the axis. If you find other equations, such as  $x^3$ ,  $\sqrt{y}$ , and  $xy$  then these equations are not linear equations.

Linear equations can also be defined as a arithmetic system in mathematics and can be described in the form of straight lines in a graph. The system of linear equations is also known as the system of linear equations.

#### ▪ **System of Two Variable Linear Equations**

Two-variable Linear Equation System is a system of equations or relations that have two variables and the power of one and when depicted in a graph it will form a straight line. And because of this, this equation is called a linear equation. (Abdillah, 2021)

The general form of the two-variable linear equation system (TVLES) is:

$$ax + by = C \quad (1)$$

From equation (1), it is defined  $x$  as the independent variable,  $y$  as the dependent variable,  $C$  as a constant,  $a$  is the coefficient of the variable,  $x$  and  $b$  is the coefficient of the variable  $y$ .

TVLES has characteristics such as using an equal sign relation ( $=$ ), has two variables, and both variables have degree one (to the power of one).

Methods that can be used in solving a linear equation problem are:

- Substitution method, which is a method of solving a system of linear equations by replacing one of the variables or variables of an equation with a variable obtained from another linear equation,
- Elimination method, which is a method of solving a system of linear equations by eliminating one of the variables or variables by adding or subtracting by equating the coefficients to be removed without regard to positive or negative values,
- Mixed Method (elimination and substitution), in finding the solution set using two methods, you may use the substitution method first after knowing one of the variable values, either or. Then enter it into the elimination method or vice versa,
- The graphical method, by depicting two equations on a Cartesian graph and, then produces a solution set from the point of intersection of the two lines. The thing to note is that when drawing the point of

the Cartesian axis it must be the same and consistent.

#### ▪ **Equation of Exponential Function**

The Exponential function was introduced in 1618 by John Napier in an appendix to his research not explicitly (implicitly). The exponential function is a linear function which is denoted by the symbols  $e^x$  and  $\exp(x)$ , where  $e$  is the basis of the natural logarithm which has a value of approximately equal to 2,7182818....

The equation of the exponential function can be written as:

$$y = e^x + C \quad (2)$$

From equation (2), it is defined  $x$  as an independent variable,  $y$  as a dependent variable, and  $C$  as a constant. The shape of the graph depends on the value of  $x$ , if the value of  $x$  is positive then the graph will increase while the value of  $x$  is negative, then the graph will decrease not touching the axis of  $x$ . The graph will not touch the axis of  $x$ , but approach the axis of  $x$  asymptotically (not intersect the axis of  $x$ ).

#### ▪ **Simple Linear Regression Analysis**

Simple Linear Regression Analysis is a statistical method used to determine the best model and determine the effect of the independent variable on the dependent variable. The simple regression model can be written as:

$$Y = \beta_0 + \beta_1 X$$

with  $X$  as independent variable, dependent variable ( $Y$ ),  $\beta_0$  constant, and  $\beta_1$  parameter of  $X$ .

#### **The COVID-19 Outbreak and the Relationship to the Level of Faith to Allah SWT**

COVID-19 is a disease caused by a new strain of coronavirus that is related to the same family of viruses as the Severe Acute Respiratory Syndrome (SARS) virus and several types of the common cold virus. Symptoms may include fever, cough, loss of the sense of smell and shortness of breath. In more severe cases, the infection can cause pneumonia or difficulty breathing. These symptoms are similar to those of the flu (influenza) or a cold or cough. These two diseases are much more common than COVID-19, so testing needs to be done to determine whether a person with these symptoms has COVID-19 or not. This virus is transmitted through direct contact with droplets from the respiratory tract of an infected person (which comes out through coughing and sneezing). Humans can also become infected by touching surfaces contaminated with this virus and then touching parts of the face such as the mouth, eyes and nose. The COVID-19 virus can survive on surfaces for several hours and spreads very quickly (Widiyani, 2020). The elderly and people with chronic health problems seem

to be more at risk of experiencing severe symptoms such as other respiratory infections such as shortness of breath, flu or coughing cold. Actions to maintain common health are very important in inhibiting the spread of this epidemic, actions that can be taken include the following,

- a. Not leaving the home when sick,
- b. Covering mouth and nose with folded elbow or tissue when coughing and sneezing
- c. Always wear a mask and hand sanitizer
- d. Diligently wash hands with soap and running water, and
- e. Clean frequently touched surfaces and objects.

The outbreak of COVID-19 has been designated a Public Health Emergency of Global Concern (PHEIC) and the virus has now spread to various countries around the world. Although the COVID-19 virus continues to spread, the public must take action to prevent further transmission, reduce the impact of this outbreak and support measures to control the disease.

The COVID-19 virus which is becoming a worldwide pandemic has unknowingly brought us to piety to Allah. In situations like this, we realize that there is nothing that God cannot do, one of which is to give trials in the form of illness. Allah repeatedly reminds His servants to always be pious, because in piety you will find peace of mind.

In Surah Al-Baqarah verse 103 Allah SWT says, "And if they believe and are pious, the reward from Allah is definitely better, if they only knew." This verse explains that if we fear Allah with all our hearts, then there will be wisdom from all these events. This attitude must be applied by every Muslim in the face of the COVID-19 disease. In addition to being patient, one also continues to pray and try the best we can to help others in this plague.

The Messenger of Allah has also advised every human being in the world about a plague. In the hadith narrated by Bukhari and Muslim, the Prophet Muhammad sallallahu 'alaihi wasallam said, "Tha'un (a contagious disease) is a warning from Allah

Subhanahu Wa Ta'ala to test His servants from among humans. So when you hear that a disease is spreading in a land, do not enter that land. And when the plague strikes in the land where you are, do not flee from it either." (Narrated by Bukhari and Muslim from Osama bin Zaid).

Furthermore, the verse of the Qur'an has also advised us to stay if there is a danger outside the house, as in Surah An-Naml verse 18 Allah SWT says, "Until when they have arrived at the valley of ants an ant will say: O ants. Go into your dens, so that Solomon and his army will not trample you, while they do not notice." From the arguments above, as a Muslim, you should know what to do in the midst of trials like this. This virus did come at the command of Allah to test humans, but that does not mean panicking in the face of it. Keep praying, begging to get rid of all the plagues that come and put your trust in an effort to avoid vulnerable things that can potentially cause the virus. That's how to get through the disaster safely.

**The relationship between the Linear Equation System in the Corona case and our devotion to Allah SWT**

The data that will be used for the simulation is cumulative case data from October 1st to October 31st, 2020 published by the kawalcovid19.id website and the official IG of the COVID-19 agency. Then this data is approached with a linear equation of an exponential curve function resembling equation (2) which mathematically has the form (Cavin, et al., 2020),

$$y = k_1t + e^{k_2t} + k_3 \tag{3}$$

Then from equation (3), the parameter estimation  $k_1, k_2, ,$  and  $k_3$  which resembles the case data for the development of the COVID-19 virus is carried out in the above equation. The results of simple linear regression analysis from October 1st to October 31st, 2020 data are obtained as follows:

**Model Summary and Parameter Estimates**

Dependent Variable: CumulativeCases

Equation	Model Summary					Parameter Estimates	
	R Square	F	df1	df2	Sig.	Constant	b1
Linear	.999	39817.780	1	29	.000	288.082	4.029

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	288.082	.370		778.361	.000
	Date	4.029	.020	1.000	199.544	.000

a. Dependent Variable: CumulativeCases

From equation (3) and the results above, The independent variable  $X$  has a contribution effect of 99,9% on the  $Y$  and the other 0,1% is influenced by other factors outside the  $X$  variable. The standard error  $\beta_0$  is obtained at 0,370 and  $\beta_1$  at 0,020. Then obtained parameter estimation  $\beta_0 = k_3 = 288,082$  and  $\beta_1 = k_1 = 4,029$ . Supposed  $k_2 = 0,08896$  to obtain a simple regression equation as:

$$y = 4,029t + e^{0,08896t} + 288,082 \quad (4)$$

So from equation (4) with the variable  $t$  being the time of positive cases of the COVID-19 per day, the graph is obtained as:

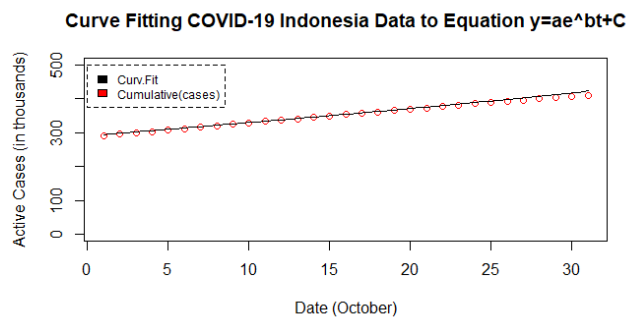


Figure 1. Curve Fitting COVID-19 Data (October 1<sup>st</sup>-October 31<sup>th</sup>, 2020) to Exponential Equation.

Based on the graph above shows that the number of people infected from time to time and continues to increase.

Based on the Figure 1, we can conclude that in a system of linear equations there are two variables, namely  $y$  and  $t$ . For example,  $t$  is the case of the victim of the covid-19 outbreak and  $y$  is the level of one's devotion to Allah SWT. By using a linear equation system that functions exponentially, we know that the

higher the number of victims who are positively affected by the Covid-19 outbreak from day to day, it will increase one's devotion to Allah SWT.

Furthermore, by using the assumption data of devotion people to Allah, the results of the Pearson bivariate correlation analysis are obtained as follows:

		Cumulative Cases	Data Devotion1
CumulativeCases	Pearson Correlation	1	.994**
	Sig. (2-tailed)		.000
	N	31	31
DataDevotion1	Pearson Correlation	.994**	1
	Sig. (2-tailed)	.000	
	N	31	31

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Based on the results above, the correlation value between Cumulative Cases and Devotion is  $0,994 > 0,355$  ( $r$  value). So it was concluded that there is a correlation between Cumulative Cases and Devotion or in other words, the higher the number of positive victims affected by the COVID-19 outbreak from day to day, the devotion to Allah SWT increases.

Next, visualize data using cumulative case data from September 1st to September 30th, 2021. Then this data is approached with a linear equation of an exponential curve function resembling equation (2) which mathematically has the form,

$$y = p_1t + e^{p_2t} + p_3 \quad (5)$$

Then from equation (3), the parameter estimation  $p_1, p_2, p_3$  and  $p_4$  which resembles the case data for the development of the COVID-19 virus is carried out in the above equation. The results of simple linear regression analysis from data September 1st to September 30th, 2021 data are obtained as follows:

**Model Summary and Parameter Estimates**

Dependent Variable: CumulativeCases

Equation	Model Summary					Parameter Estimates	
	R Square	F	df1	df2	Sig.	Constant	b1
Linear	.802	113.588	1	28	.000	7.847	-.237

The independent variable is Date.

**Coefficients<sup>a</sup>**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	7.847	.394		19.895	.000
	Date	-.237	.022	-.896	-10.658	.000

a. Dependent Variable: CumulativeCases

From equation (5) and the results above, The independent variable  $X$  has a contribution effect of

80,2% on the  $Y$  and the other 19,8% is influenced by other factors outside the  $X$  variable.the standard error

is  $\beta_0$  obtained at 0,394 and  $\beta_1$  at 0,022. Then obtained parameter estimation  $\beta_0 = p_3 = 7,847$  and  $\beta_1 = p_1 = -0,237$ . Suppose  $p_2 = -0,1596$  that the following simple regression equation is obtained:

$$y = -0,237t + e^{-0,1596t} + 7,847 \quad (6)$$

So from equation (6) with the variable  $t$  being the time of positive cases of the COVID-19 per day, the graph is obtained as :

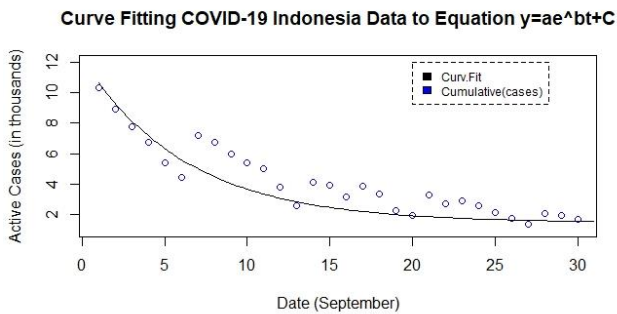


Figure 2. Curve Fitting COVID-19 Data (September 1<sup>st</sup>-September 30<sup>th</sup>, 2021) to Exponential Equation.

Based on the graph above shows that the number of people infected from time to time and continues to decrease.

Based on the Figure 2, we can conclude that all people must not be careless and continue to increase their devotion to Allah SWT although active cases of the COVID-19 virus have decreased significantly. One of them is holding his heart from anger when he hears the news that there is someone who does not comply with the health protocol. In the hadith narrated by Bukhari and Muslim, the Prophet Muhammad sallallaahu 'alaihi wasallam said, "A strong person is not a person who is good at wrestling. However, a strong person is one who is good at restraining himself when angry." (Narrated by Bukhari and Muslim). In addition, every Muslim must increase their worship or observance such as fasting (puasa), praying 5 times a day, and helping and giving charity to people affected by the COVID-19 virus.

Furthermore, by using the assumption data of devotion people to Allah, the results of the Pearson bivariate correlation analysis are obtained as follows:

Correlations		Cumulative Cases	Data Devotion1
CumulativeCases	Pearson Correlation	1	-.818**
	Sig. (2-tailed)		.000
	N	30	30
DataDevotion1	Pearson Correlation	-.818**	1
	Sig. (2-tailed)	.000	
	N	30	30

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Based on the results above, the correlation value between Cumulative Cases and Devotion is  $-0,818 < 0,361$  ( $r$  value). So it can be concluded that there is no correlation between Cumulative Cases and Devotion or in other words, the lower the number of positive victims affected by the COVID-19 outbreak from day to day, the devotion to Allah SWT decreases.

In dealing with or preventing the Corona virus or COVID-19, every human being needs to further increase his devotion to Allah SWT with patience, istiqomah and endeavor to keep the family clean and physically and mentally. According to the Secretary of the MUI Fatwa Commission Arorun Niam Sholeh, he said, "MUI urges the public, especially Muslims, to continue to contribute in preventing the circulation of COVID-19 with physical and spiritual efforts. The inner effort is to increase faith and piety to Allah SWT, increase worship, increase munajat, until every fardlu prayer is interspersed with prayers to Allah SWT with full sincerity. He also asked Muslims to say qunut nadzillah because of the COVID-19 outbreak.

### Conclusion

The System of Linear Equations of Two Variables or TVLES is a system of equations or relations in the form of the same as in algebraic form which has two variables and the power of one and when depicted in a graph it will form a straight line. By using a linear equation system that functions exponentially for victims exposed to COVID-19, we know that the higher the number of victims who are positively affected by the COVID-19 outbreak from day to day, it will increase one's devotion to Allah SWT. Then, all people must not be careless and continue to increase their devotion to Allah SWT although active cases of the COVID-19 virus have decreased significantly.

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