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Understanding the Theory of Force with Islamic Philosophy

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Abstract
Understanding science, especially physics, can not only be done with theory and formulation. It should relate the physics theory studied to everyday events. In addition, strengthening the characteristics of learning in madrasas can be done with an approach to religion (Qur'an science). The dichotomy occurring between science and religion makes them look like not interconnected. In fact, the Qur'an is the source of all sources of knowledge. The study of the integration between religion and physics presents a direction that can break the deadlock of physics problems. It is hoped to form an integration between religion and physics, which gives two understandings at once when learning. Examining the force and its relation to Newton's second law, also means examining the mass and acceleration. These quantities have a reciprocal relationship that can be peeled down in terms of religion and its relation to life. Mass can be analogous to the inertia (willingness) of a person to change his state, which is later also influenced by the quantity of the action (force) that a person will perform, and the determinant of the acceleration of his life (with a change in circumstances). Learning about force (**F**) will be closely related to acceleration and mass. A person with an enormous mass (m>>) will be more inert, because of which the acceleration he has will be smaller (a<<).

INTRODUCTION

Science is one of the important components in human life. Science is a process of activity carried out by humans to strive for scientific knowledge that is sought rationally (critically, logically, and systematic), objectively and universally (Wahana, 2007). The wealth of science is precious and can be used as an answer in dealing with problems and to bsolve problems in life. Science is the entire conscious effort to investigate, discover, and improve human understanding of various facets of reality in the human realm. We limited these facets in order to produce definite formulations (Eldes, 2015).

Natural science is a science obtained through the activities of observing, collecting data, analyzing data, and making general conclusions systematically and acceptably resourceful. It is about the constituent components of the surrounding nature, both living components such as humans, animals and plants and non-living ones such as some objects, mountains, seas, rivers, lakes, and others. God has signaled about the signs of His greatness that can be observed through science. This can be the

basis for the development of Islamic science to be used as material for more in-depth studies in its integration with science education. The reflection of islamic thought in the perspective of physics is a strategic and interesting content. This is important to do because the study of anything must allow the ummah to mention his God (*bismirobbika*). This includes the emergence of awareness in man to increase devotion and servitude to Allah. The entire study of physics can actually provide reflection towards awareness of the values of the essential truth (Kadir, 2008).

Science born and developed based on the willingness of humans to solve problems in their lives through a long-thinking process. In addition, science can also develop because of human efforts to learn more about pre-existing science as an effort to develop and preserve science. To get a better life, we need to have knowledge. The abundance of problems in life can be solved by developing science and technology. However, the development of science also has a negative side that needs to be watched out for its impact. The development of science and technology sometimes cannot guarantee good morals for humans.

The feud between religion and science is a classic issue that is still developing in the western world as secularism. However, Islam does not approach this issue of science from that perspective because the Qur'an and al-Sunnah have provided a complete and perfect system that covers all aspects of human life, including scientific activities or scientific investigations. Thus, scientific activity is an integral part of the entire islamic system in which each part contributes to the other (Fakhri, 2010).

The role of islam is very important in building science. The reality is that because of the rapid flow of secularization, nowadays muslim society seems to be forced to live secular teachings in its life (Adnan, 2017). Secular teachings and their development only seek to trace things that appear and are worldly only and not based on the concept of an Islamic worldview (Hadi & Ashari, 2020). Islamization of knowledge, according to the views of islamic scholars, is something that must be formulated to bring about the crisis of the current of secularization in modern society (Alwi, 2017). The process of Islamization of science, especially physics, can be done by observing the symptoms of nature. In addition, contemplating verses sourced from the Qur'an, then thinking about their relation to existing theories of physics.

There is a relationship between the Qur'an and physics that is very close and complete with no barriers to being separated from each other. All forms of science in the world have been written in the Qur'an, whether express or implied, something must do correctly meaning and interpretation and carefully (Khoiri et al., 2017). In studying science, there are activities using the scientific method to find the truth through the interaction of reason with the five senses of man with nature or the surrounding environment. The object to be studied from science is everything, both living and non-living objects, that can be studied with panca (Muiz, 2019). The Qur'an has an implied meaning in each of its verses man can study every hidden meaning by studying the Qur'an in depth. This activity, besides bringing rewards, also adds self-confidence to always have faith and devotion to Allah SWT. The value of Qur'an with scientific concepts is implementing by the West Sumatra government as one of its vision (Chandra & Lizelwati, 2022).

Physics has a very basic urgency in life. In learning physics, many things become obstacles for students to enjoy. They often considered physics as a hard science to learn because it is not only full of theories, formulations, and numbers. It is considered equations and basic and derivative formulations that have a physical meaning of a complicated saturating thing for some people. It is possible for us to understand physics by making a logical analogy by connecting what happens in our lives and what if we look at it through the lens of physics. We expect this to make the notion of physics we can brush a difficult and unpleasant exact science off. Newton's law is one of physics concept that studied in school. Some studies have been developed to understand this concept (Idrus et al., 2021). However, it still does not include the concept of Qur'an. This study aims to find analogies in the science of the Qur'an that can be used as a guide in understanding the basic concepts of Newton's Laws. Analogy is obtained by using philosophy as a theory that underlies thinking by combining logic, aesthetics, metaphysics, and epistemology.

METHOD

This research uses the literature study method. The main sources using in this study is Qur'an and physics textbooks. Other sources are some references from articles and books about physics and its relation with Islamic region. These sources use in building analogy in forming physics understanding and the Qur'an. It will connect the concept of physics with the theory of physics, especially material forces. Connections are obtained with the help of philosophy as the root of science, with an approach using reason, logic, and analogy. It carried the approach out to find the relationship that is about the theory being studied with life.

RESULT AND DISCUSSION

Qur'an continues to invite people to use their minds and eyes of the heart. The Qur'an also brings people to think, then reflect and draw conclusions from all natural events. An in-depth reflection led man to a conclusion that the universe is a creation of God (Rashed et al., 2016). Some scientists try to draw conclusions from several theories of science to be used and taken as lessons or as a reference in life. Science is one of the sunnatullahs, the regularity of all processes in the universe is evidence of nature's submission to God's commands. It is not wrong if scientists can make wisdom from some physical theories to learn to respond to life. In physics, trying to make understanding classical physics material and modern physics material as an attitude to make wiser is taking wisdom from the theory studied (Kadir, 2008).

الَّذِينَ يَذْكُرُونَ اللَّهَ قِيَامًا وَقُعُودًا وَعَلَىٰ جُنُوبِهِمْ وَيَتَفَكَّرُونَ فِي خَلْقِ السَّمَاوَاتِ وَالْأَرْضِ رَبَّنَا مَا خَلَقْتَ هَٰذَا بَاطِلًا سُبْحَانَكَ فَقِنَا عَذَابَ النَّارِ

"They are those who remember Allah while standing, sitting, and lying on their sides, and reflect on the creation of the heavens and the earth ˹and pray˺, "Our Lord! You have not created ˹all of˺ this without purpose. Glory be to You! Protect us from the torment of the Fire. (QS. Al-Imran [3]:19)"

Quran Surah Al-Imran (3):191 above explains that a reasonable person is a person whose entire activities always remember Allah SWT and start all his activities by mentioning the name of Allah SWT. The thinking process carried out by people who are sensible in learning their knowledge is actually one component that increase the sense of faith and devotion to Allah SWT, to avoid despicable deeds and hellfire. The concept of integration between science and the Qur'an talking about the knowledge of science can strengthen the science of fardhu kifayah, a person in knowing about Allah who can increase his faith. A person is said to have faith if he does fardhu kifayah practices such as engineering knowledge, medicine, chemistry, physics, geology, and others based on science (Azizan, 2007)

It can also do the long thinking process for other, namely understanding the concept of physics through Islamic concepts. Thus, physical sciences and religious sciences will appear to have inseparable connections. We expect this method to be effective in being able to enjoy physics, starting from a long process of contemplation of the verses of the Qur'an. This long-thinking process can be referred to as philosophizing.

Philosophy of Newton's Laws

Force is a quantity that has a certain magnitude and direction. An object can move if it receives the force that comes to it. The bike can drive when it is subjected to a force like a stroke on the bicycle pedal. Force is a push or pull that becomes an aspect of cross interaction between two objects. If it subjects the object to force, it will cause changes in the shape, speed, and direction of the object.

We can group force into touch styles and non-touch force. Touch force occurs due to direct interaction as touch between the two objects. Examples include friction force, spring force, and muscle force. While the touchless force is a force given to objects but not touching objects. Examples include the graphitization force (the earth's attraction force) and the magnetic force.

If we talk about force, something closely related it to the action we give to something. For example, when we want to lift an object whose mass is 10 kg. In theory, that means we need force 98 newtons. It derived this from the

formulation of the force that Newton expressed by equation (1) and (2).

$$a = \frac{\sum F}{m} \quad (1)$$

while:

$$\sum F = m\, a \quad (2)$$

where $\sum F$ is Force (in newton), m defines as mass (in kg), and g is the acceleration of gravity (9.8 m/s^2).

The greater the mass we want to lift, automatically we also have to spend a large force as well. This means that the relationship between mass and force is directly proportional. Equation (1) showed that acceleration (a) has a directly proportional to the number of forces (F), and inversely proportional to the mass of the body (m) (Newton's Law II). We express it in Newton's Law II that "*The acceleration of a body, proportional to the force and inversely proportional to the mass*".

A person who wants to speed up the speed of his bike, automatically he must exert a large force on the pedals of his bicycle, and vice versa if we want to slow down the speed of the bike, we can do it by reducing the stroke which automatically reduces the force. Physically and systematically, it can be said that the relationship between acceleration and force is directly proportional as shown in equation (3).

$$\frac{\boldsymbol{a_1}}{\boldsymbol{a_2}} = \frac{\boldsymbol{F_1}}{\boldsymbol{F_2}} \quad (3)$$

Where $\boldsymbol{a_1}$ **is** initial acceleration (m/s^2)**,** $\boldsymbol{a_2}$ **is** final acceleration (m/s^2), $\boldsymbol{F_1}$ is initial force (newton) and $\boldsymbol{F_2}$ is final force (newton)

By another analogy, a bike whose mass is lighter (m<<) is certainly easier to drive (a>>) than a heavy bike (the mass is greater). Person, who is large (m>>) has difficulty running (a<<) compared to a person who is small in body. The relationship between acceleration and mass is inversely proportional through equation (4), where m_1 is initial of mass (kg) and m_2 is final mass (kg)

$$\frac{a_1}{a_2} = \frac{m_2}{m_1} \quad (4)$$

The two relationships above explain how Newton's Law II. Some of the above analogies are a simple way of understanding the principle of Newton's Law II.

Philosophy of Newton II's Laws in Life

In life, we often face human beings with problems. Every human being responds to his problems differently. If we dig deeper, we can philosophize the relation of existing theories to their analogies in life. If we carry this meaning in life, suppose it is when we are overwritten by a problem. Then the problem we face can be analogous to the mass (m) that we will raise. For much of the problem, we must also prepare a large action force to solve it, and vice versa. This corresponds to the parallel between the force and the masses. Another analogy that we can relate to is that the acceleration of the level or man before inertia (inertia) also influenced Allah Almighty. Mass (m) measures the quality of inertia to maintain the magnitude of the acceleration (a). We need to reduce inertia (reduce mass) so that we tend to become inert and easier towards changing circumstances.

إِنَّ الْمُنَافِقِينَ يُخَادِعُونَ اللَّهَ وَهُوَ خَادِعُهُمْ وَإِذَا قَامُوا إِلَى الصَّلَاةِ قَامُوا كُسَالَىٰ يُرَاءُونَ النَّاسَ وَلَا يَذْكُرُونَ اللَّهَ إِلَّا قَلِيلًا

Surely the hypocrites seek to deceive Allah, but He outwits them. When they stand up for prayer, they do it half-heartedly only to be seen by people—hardly remembering Allah at all. (Q.S. An Nisa' [4]: 142)

The above verse talks about laziness (inert). The intended laziness can be as laziness in using reason and laziness in using his limbs. I said lazy people to be inert people (m>>>). This inertia measures the level of a person's willingness to change or get out of the situation he is experiencing or we can also call it the acceleration of changing circumstances (a). The more inert (lazy) that person is, we say the greater the mass to be greater (m>>) and the more difficult it is to change the situation that occurs in him (a<<). Conversely, if man minimizes his inertia (reduces his mass, m<<) by reducing laziness, then the ability to change the situation is also greater (the faster in changing his self-esteem, a>>). All of that, of course, with the permission of Allah Almighty

In the Quran QS Ar-Ra'd [13]: 11

لَهُ مُعَقِّبَاتٌ مِنْ بَيْنِ يَدَيْهِ وَمِنْ خَلْفِهِ يَحْفَظُونَهُ مِنْ أَمْرِ اللَّهِ ۗ إِنَّ اللَّهَ لَا يُغَيِّرُ مَا بِقَوْمٍ حَتَّىٰ

يُغَيِّرُوا مَا بِأَنْفُسِهِمْ ۗ وَإِذَا أَرَادَ اللَّهُ بِقَوْمٍ سُوءًا فَلَا مَرَدَّ لَهُ ۚ وَمَا لَهُمْ مِنْ دُونِهِ مِنْ وَالٍ

For each one there are successive angels before and behind, protecting them by Allah's command. Indeed, Allah would never change a people's state ˹of favour˺ until they change their own state ˹of faith˺. And if it is Allah's Will to torment a people, it can never be averted, nor can they find a protector other than Him. (Q.S Ar Ra'd [13]: 11)

فَإِذَا قُضِيَتِ الصَّلَاةُ فَانْتَشِرُوا فِي الْأَرْضِ وَابْتَغُوا مِنْ فَضْلِ اللَّهِ وَاذْكُرُوا اللَّهَ كَثِيرًا لَعَلَّكُمْ تُفْلِحُونَ

When they saw the fanfare along with the caravan, they ˹almost all˺ flocked to it, leaving you ˹O Prophet˺ standing ˹on the pulpit˺. Say, "What is with Allah is far better than amusement and merchandise. And Allah is the Best Provider." (Q.S. Al Jumu'ah [62] :10)

These two verses of the Qur'an can be used to understand how acceleration and force relate. Allah Almighty has revealed that it will not change the state of a people before the people themselves are trying to change it. "Changing circumstances" shows how much "acceleration" is obtained. Circumstances that change for the better than before show a human being has managed to 'more quickly' improve his life (a>>). It certainly achieved all of that by enlarging the portion of the action (F>>) (action = force). People who are lazy to act (F<<) will certainly find it difficult to change their life circumstances (a<<). We can say that between the action (F) and the speed of change of state (a) is comparable.

Physically, the force applied when someone pushes an empty stroller differs from the force applied when pushing a stroller full of goods. If the magnitude of the force is the same, then the time needed to push an empty train from rest 10 meters will differ from the time to push a full train the same distance, with the same initial speed of zero or a state of rest. The force needed on an empty stroller is relatively smaller than on a full stroller filled with goods at the same distance and the same time. Likewise, pushing a broken car alone will be felt much more difficult than pushing a broken-down car with several people. This phenomenon shows that there is a relationship between the amount of force applied and the resulting acceleration (Priyanto, 2014).

The analogy process above is understanding that can boost students' cognitive abilities. The focus of the material will not be diverted because the philosophy used is a logic that can be digested with common sense. The cognitive ability of students will certainly increase if understanding supports it and assimilating knowledge that has been acquired with new knowledge into a unified whole and connected to each other. The trigger that can be used is a material that can lead students through an introduction or material because it related the material to and underlies the material of Newton's Laws (Hau & Nuri, 2019).

"Let's show your action, for a better life". Every Muslim must try earnestly and work hard to stay away from laziness. This earnest and hard-working attitude is also called tawakkal. Tawakkal is one characteristic of believers.

Learning about force (***F***) will be closely related to acceleration and mass (inertia). A person with an enormous mass (*m*>>) will be more inert (lazy to move), because of which the acceleration he has will be smaller (*a*<<). This teaches us how to get rid of all the feelings of laziness (inertia) in trying, so that we can survive to achieve what we want faster and become better people. As well as how to enlarge the action so that the state of life immediately changes for the better.

CONCLUSION

Finding the meaning of physical quantities can not only be done physically and mathematically. Thinking and pondering can also present a new idea to make others understand a theory. Using philosophy in learning physics can also be used as an alternative to understand physics more easily. Every lazy person to be inert has an enormous mass which will certainly be difficult to change his situation. To cope with inertia, real and large actions are needed. Finding meaning in life can be done by brooding. A person who reflects on his situation will understand how science can be used as a medium in understanding more deeply the meaning of life and religious science.

Connecting science with religion is important so that the learning carried out is more meaningful. We see the symbiosis between the two when the person understands the physical and the meaning of his religious knowledge.

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