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Pros and cons of different types of geometry

Areej Alshareef

Geometry must be as longstanding and deep rooted as humans' fight for the sake of survival. Making a good hunting bow and the different kind of arrows having different shapes surely involved some special kind of intuitive gratitude of distance, space, direction, and kinematics. In the same way, delimitating the enclosures, constructing the shelters, and accommodating the little hierarchical or classless communities must have presumed an appreciation for the ideas, concepts and designs of center, length, equidistance,area, straightness and volume.Some of the above mentioned illusorily "clear" terminologies remain vague as human beings are not very well servedand aided all the time by different kinds ofmathematical acculturation that encompasses even one of the finest available instruction in fundamental geometry. Different shapes need different kind of rules to relate them with real world and different kind of geometry types are used for this purpose.

Curious geometrical shapes and configurations are abundant. There are so many shapes provided by the nature that it becomes difficult to even name every shape. Different kinds of fruits and vegetables have different shapes and even same kind of fruits and vegetables can have different shapes and interesting configurations. The splendorinserted in these naturally occurring shapes is not only pleasing but also enthralling. A great number of mathematicians worked on the development of theoretical progresses in the field of patterns comparable to the ones visualized above(Pitici, 2008). Mathematicians found allusive models that are useful in understanding different kind of patterns and discovering a number ofapplications(Pitici, 2008). In case of geometry, there are three very important types of geometry which are Euclidean, Riemannian, and Lobachevskian geometry and categorized and explained on the bases of different shapes(Katz, 2002). One of them is better than the other two on the bases of better theoretical evidences and practical applications in order to describe a specific shape(Katz, 2002).

Euclidean Geometry is an important type of geometry which deals with flat space. It is easy to draw different geometric shapes or drawings on a flat paper or board(Katz, 2002). It is the most common type of geometry which is in practice worldwide and deals the easiest concepts and rules related to the geometric shapes such as the shortest distance between two points can be only one unique straight line and 180 degrees is equal to the sum of all three angles in any kind of triangle (Roberts). It is one of the oldest type of geometry which rules the world of mathematics. Although, some earlier Greek mathematicians did some work on geometry, but it was a Greek mathematician, Euclid, who provided the evidence for all rules by developing the inclusive deductive system and then proving it with the help of different rules(Roberts). So, Euclidean Geometry was named after him as he contributed a lot to develop different rules and laws. Although, all rules were proved, but the basic elements such as point, line and plane to prove the rules were undefined. Euclid also proved many theorems on the bases of several kinds of assumptions(Roberts). There are several laws which were developed under Euclidean Geometry; one of the most important theorem is Pythagorus Theorem(Sormani, 2002). It is the base of trigonometry and there is a huge list of rules which was developed on the bases of Pythagorus Theorem. Many trigonometric laws like laws of cosines and laws of tangents are some of the trigonometric laws that are widely applicable in different fields of the science and technology (Roberts).

Although, Euclidian Geometry is widely applicable, spherical surfaces cannot be described using flat piece of paper or in other words it is difficult to draw and model spheres on flat piece of paper having two dimensions as there are no lines on a spherical shape(Sormani, 2002). On a cylindrical shape, some geodesics can be prolonged to make lines, but many of them begin to wrap around the cylinder and thus cannot be drawn-out(Sormani, 2002). Such surfaces are tougher to study than any kind of flat surfaces. Still there are some theorems which can be utilized to assess the length of the triangle's hypotenuse, a circle's circumference and area. Such assessments can be done only by estimating differenttermslike whether the surface is bent orcurved. Riemannian geometry can best describe such curved surfaces(Sormani, 2002).

An important tool was described andutilized to measure that how much a surface is curved. This measurement is known as Gauss curvature or sectional curvature. Most of the vector calculus is based upon this specific kind of geometry(Sormani, 2002). Using different rules described by vector calculus it can also be described that how area of a surface can be measured. Again different trigonometric functions and double integrals can be used to measure the surface are without approximations(Sormani, 2002). Sometimes,it become essential to use change of variables method compute double integrals. Such techniques can easily be applied using different rules of Riemannian Geometers(Sormani, 2002).

Like most of the mathematicians, Riemannian mathematicians developed different theorems regarding geometry, however, there are many theorems which do not have any kind of practical applications(Sormani, 2002). Gravitational lensing was studied using different theorems of Riemannian geometry and without having such mathematical theorems, physicists could have trouble in discovering and developing several theories and describing them (Sormani, 2002). For instance, Einstein studied Riemannian geometry before developing several important theories. Einstein equation involves a special kind of curvature that is known as Ricci curvature. This Ricci curvature was initially defined by some mathematicians and it proved very useful for Einstein to develop different theories. Ricci curvature is a very special type of curvature that is normally used in three or more dimensions. This curvature is a trace of a matrix and have applications in linear algebra too(Sormani, 2002).

Lobachevskian geometry is a specific type of non-Euclidean geometry(Roberts). When geometers initially realized that they are working with some shapes which cannot be fully justified by the standards and rules of Euclidean geometry, they defined the geometry under a number of different names such as hyperbolic geometry, non-Euclidean geometry, saddle geometry and Lobachevskian geometry. This shape is graphically known as hyperbolic paraboloid (Roberts). Nikolai Lobachevskywas a Russian geometer who was one of the discoverer of this specific kind of geometry and it is known as Lobachevskian geometry after his name, however, commonly it is known as hyperbolic geometry(Roberts).

Mostly this kind of geometry deals with saddle shaped space such as the shape of aPringle potato chip. Unlike Riemannian geometry, it is very tough to see real-world applications of Lobachevskian geometry(Roberts). However, Lobachevskian geometry has applications to certain fields of science and technology like the orbit prediction of objects inside the intense gradational fields, astronomy, and space travel. Einstein used Lobachevskian geometry to state that the space is curved(Roberts). He also used different rules of Lobachevskian geometry to describe the general theory of relativity. According to the shape with which this kind of geometry deals, some rules are slightly different from the other two kinds of geometries. One of the important rule is that the sum of the all three angles of a triangle cannot be equal to 180 degrees; it is less than 180 degrees(Roberts). In Lobachevskian geometry, there are no triangles having similarity between them(Roberts). It was developed in early nineteenth century.

At the end, it can be summed up that Euclidean, Riemannian, and Lobachevskian geometry all have different rules, laws, assumptions, and axioms. Some rules are common, but according to the shapes each kind of geometry deals, it can be said that each new type of geometry evolved when previous one failed to explain any specific kind of shape or shapes. Euclidean geometry has most of the applications in a number of fields, but fails when shapes like sphere has to be evaluated. When Euclidean geometry fails to relate its laws with spherical shape then Riemannian geometry plays its role to use different laws for proper application(Katz, 2002). Riemannian geometry deals perfectly with different shapes such as spherical and cylindrical shapes without the need of approximations and estimations. Again when Riemannian geometry fails to deal with any specific kind of shape, Lobachevskian geometry plays its role to solve the issues. So, it can be said that each kind of geometry plays an important role in developing real world applications related to the different simple and complex shapes and none can be considered as more important than the other type of geometry. Each type of geometry has its own pros and cons and can be used to resolve the issues related to the different shapes without the need of estimations and approximations.

As different postulates and laws are related with each kind of geometric type, assumptions created some loop holes relating the rules and laws with the real world. However, each type of geometry played an important role in developing a number of real world applications. These rules have played important role in developing several fields of science and technology, but most important and remarkable applications are related to the field of physics.

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