

# *The Mysterious Connection between Physics and Mathematics*

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When we take a look at a Peugeot BB1 and we are in awe of its beauty and its complex framework and inner workings. We realize that its framework, engine and every other component that makes it up the car are all connected in some way from the design down to the physical system. An expansion of the interconnection of this beautiful piece of work, allows must fit together and the design of each component is a function of the other components. Extending this idea to the creation of the universe, we see that the universe has to have been interconnected in its design. Every part of the universe must have been a function of other parts during creation and even as dynamics plays its role, the interconnection of these parts is not severed at all. This idea is independent of the fact that there is a God or Not. It simply states that all things are connected in a seemingly perfect way. By implication, that which is true for the whole is also true for its parts. Hence, we can safely say that everything on earth is connected in a regular pattern not fully grasp by the human mind.

The connection between physics and mathematics seems at first mysterious. The knot that ties them together is much like clear glass in very

bright white light that it sometimes goes unnoticed. However, this doesn't mean that their link is none existent, not at all. In fact it only makes you want to search harder to understand how this knot came to be. What we try to do here is to break and reconstruct the link between these two giants of science.

In everything we analyze, there are two possible ways of establishing a conclusion, one complements the other. The first method is a physical/general representation and analysis of the situation which provides possible limitations to the problem. The second is a mathematical representation of the problem at hand which provides a list a solutions to the situation given. In other words this involves using physics and mathematics to analyze and solve problems. So what then is the connection between these two?

First, let me start by explaining the nature of Physics in the hope that this will help clarify our goal as regards this subject matter.

Physics is "the study of physical entities and the laws governing their existence and interconnections with other physical entities". This means that in the study of a glass cup, for example, we would describe its physical attributes such height, weight, type of material, color, etc. Then we would consider how it interacts with other materials, such as, the forces exerted on it by other materials. Now this describes the

nature of the material as we see it. But this isn't all physics can do, we can also describe spatial entities which aids in understanding how objects interact and move through space or rest. As we can see physics gives us a descriptive analysis of a particular object of study, it tells us possible reasons why objects behave in a particular way in their day to day activities and how we can alter these findings to suit our needs.

As we go deeper into the study of physics we realize that although we know the how and why, we also need to understand just how much and we need some way to quantify the objects nature and its interactions because we are aware of the limitations set by nature on our environment. This is where Mathematics comes in. The Cambridge Advanced learner's dictionary defines mathematics as "the study of numbers, shapes and space using reason and usually a special system of symbols and rules for organizing them". This is true in when we discuss strictly the study of mathematics. However, the relationship between mathematics and physics goes beyond this. The reason behind the use of mathematics in the analysis and representation of physical systems takes root in the fact that mathematics as a subject includes the representation of shapes

and physical systems, and it helps in creating easy ways of manipulating the behavior of physical systems.

We may then ask ourselves, if mathematics and physics study and analyze the nature and interactions of objects, what then is the difference between them? We may also ask ourselves, are physics and mathematics even connected? Well, theoretically there are differences and similarities which are quite obvious. I would say the difference between mathematics and physics lie in what they analyze and their similarities are due to the fact that what is analyzed is a single entity. This means that if given a physical system comprising of various other subsystems, physics helps us to describe the nature of this system and to tells us how these subsystems would be connected together to form the whole system. However, we may then be faced with the question, what then does mathematics do in all of this? Okay, we just described this systems and its parts and we know how it works, but this isn't enough there has to be more to system, how do we manipulate these systems to our satisfaction and still keep to the set, such that the system does not become erratic? This simple but extensive question has a base in mathematics. Mathematics provides us with a solution to

obtaining a simpler representation of a system and finding ways to manipulate this system to get a desired output.

The use of mathematics and physics has been around for a very long time. These two working together help to simplify a problem and create several workable versions for available physical systems. So, the truth behind the connection between Mathematics and Physics lies in the fact that Physics describes the state and analyzes the nature of the object of study while mathematics represents and manipulates the object for simpler analysis.

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