

# Music is a kind of mathematics

[Science](#), [Mathematics](#)



" Music is a kind of Mathematics".

" Mathematics are a measure of beauty even when man is a measure of beauty". I heard the professor saying these two sentences in class and it hit me hard. I remembered the teachers in lower classes telling us that Mathematics are the key for everything in life and we didn't believe them, protesting that " Art", for example, has nothing to do with Mathematics. Apparently, they were right.

But how come do Mathematics seem to be considered as a measure of beauty?

Many philosophers have said and written about art's beauty and aesthetics, and it always included some kind of Mathematics in it. In 1150 AD, Acharya Hemachandra wrote about, what's now called Fibonacci Numbers (In Mathematics, Fibonacci numbers are specialized that the last number is the sum of the two previous ones, such as the following: 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233, 377, 610...), in poetry lines, 70 years before Fibonacci published his own experiment in his first edition of Liber Abaci.

In addition, Pingala seemed to have used them in 200 BC, by considering poetry patterns divided to two lengths of syllables; long and short. In 1, 2 and 3 syllables there's always matching ways to put them. But when it comes to 4 syllables there's 5 ways, just like for 5 syllables there's 8 ways and so it goes. And that's what's special and beautiful about poetry and more precisely rhythm.

The Fibonacci numbers were also utilized by many arrangers when composing music, and many poets say that the Golden Ratio goes back to the time of the middle ages. The researches show that Stradivari knew about and utilized the Golden Ratio to put the f-holes in his famous violins. And then there's Baginsky's strategy for constructing violins which is in light of the Golden Section. Music made by Mozart, Bach and Beethoven seem to be based on the Golden Section too.

Maybe this is the reason why their music is beautiful. Books about oil painting in all libraries will probably call attention to that it is better to use lines that divide the picture to thirds and to position objects on one of the sides or " around 33%" of the way across rather than in the middle of the picture.

This appears to upgrade the photo to make it more satisfying to the eye and this idea depends again on the Golden Ratio being " perfect", leaving behind what's called a beautiful masterpiece painting. Moreover, physical attraction relies upon proportions, and specifically symmetry. When someone else's body is in proportions and symmetrical, it's more likely for us to find it more attractive and beautiful. In the same manner, if a face is proportionate, we will probably notice it quickly and think that it's beautiful and perfect.

Leonardo da Vinci's illustrations of the human body accentuated its ratio. Essentially, it is trusted that buildings might be more appealing to a number of people if the proportions used are based on the Golden Section. Therefore, the Golden Ratio is taught to architecture students rather than civil

engineering students, because architecture is more related to aesthetics which is globally based on Mathematics.

For instance, Vitruvius had explained many artistic and architectural things based on proportions, and those are based on Mathematics: -Natural colors, which are found in specific places, and artificial colors that are combined in proper proportions.-" It is thought that the columns of basilicas ought to be as high as the side-aisles are broad; an aisle should be limited to one third of the breadth which the open space in the middle is to have.

"(Vitruvius, The ten books on Architecture, Book V, p. 132) Sizes, in this case, are also proportionate, which increases its beauty as much as it assures its stability. The Golden Section, widely the Fibonacci sequence, also happen in nature, in the patterns we sometimes find in pine cones, pineapples, artichokes, petals of flowers, the leaves of the plants... Generally, because of the best approaches to efficiently pack things firmly together, using the Fibonacci sequence.

(The plant needs to get sunshine on all its leaves without one getting in the way of another or else it would be bad for it, that's what it does without special intervention, as the plant doesn't do Mathematics, scientists considered the idea of the Golden Section as its natural growth.)

And since God has created everything, some researchers and scientists tend to say that God is the greatest Mathematician such as the following list and many others:-Galileo Galilei who confirmed: " Mathematics is the language

with which God has written the universe."-That in addition the Euclid: " The laws of nature are but the Mathematical thoughts of God.

"-And Paul Dirac said: " If there is a God, he's a great mathematician. God used beautiful mathematics in creating the world.

"-To end this here's what Maulana Wahiduddin Khan believed: " The truth is that God is the greatest Mathematician, the greatest artist and the greatest genius."

Just like some people consider that beauty is based on Mathematics, " all mathematicians share a sense of amazement over the infinite depth and the mysterious beauty and usefulness of Mathematics" (Martin Gardner), in addition to other people who consider Mathematics as the queen of science(or not even a science, just a beautiful thing).

They say that Mathematics is the only place where truth and beauty mean the same thing. And from their point of view, if it is correctly used, it has truth as well as preeminent aesthetics.

And when someone asked him why he considered numbers beautiful, Paul Erdős said: " It's like asking why is Beethoven's Ninth Symphony beautiful. If you don't see why, someone can't tell you. I know numbers are beautiful. If they aren't beautiful, nothing is"?