

CAN MUSIC THEORY EXPLAIN THE ENTIRE UNIVERSE?

A PHILOSOPHICAL DIGRESSION

As we studied music theory we have been able to extract some underlying rules that hold true across all fields of music. But can these rules be applied elsewhere? Could it be that music is the key to the Universe? Read on and see what you think.

ONE WITH EVERYTHING

You must have heard the one about the East Indian mystic that walks up to the hot dog vendor and says, "Make me one with everything." The more I learn about things, the more I'm convinced that we really are "one with everything." Everything seems to be interconnected and bound together by a network of underlying common rules. History may just be the story of different people's journeys as they chose different paths to move them closer to an understanding of these rules. For some the path is called spirituality and for some it is science but for all it is really the same journey. What we have been learning about music may only be one part of the journey but this knowledge will help us to notice the underlying rules as we continue upon other parts of our journey.

ONE TO MANY AND MANY TO ONE

Science can be used to understand and describe music but ultimately the experience is part of our spiritual journey. The ancients made fewer of these separations than we do today. Philosophy, science, math, music, nature, God — everything was intuitively felt to be interconnected. As their understanding of the world around them grew, the detail and complexity of the different fields of knowledge swelled exponentially and ultimately warranted their separation into discrete fields of study. Even so it was still possible for one individual to know all there was to know about the world in which they lived. This age of the Renaissance scholar came to an end in the mid-nineteenth century. At that time the global store of knowledge was growing so fast that it forced people into the age of specialization. Scholars today know a lot but in ever narrowing fields of specialization. In opposition to this is a movement by scientists, especially cosmologists, to find the underlying set of rules that bind all the separate fields together as one. This has gone by many names: the Gauge Theory, The Unified Field Theory, The Theory of Everything and more recently String Theory, Super String Theory and Super Symmetry. Throughout history others have pursued the quest for a set of unifying rules in various fields. These discoveries may actually be the same as ours.

BODE'S LAW

In 1766 Titius of Wittenberg stated that—very roughly speaking—each planet was about twice as far from the Sun than that of its predecessor. In 1778, building upon that observation, J. E. Bode published a method that appears to define the relationship between the mean distances of the planets from the sun in Astronomical Units (where 1 A.U. is the mean distance between the Sun and the Earth) and it works like this. Write down a zero, then a three, then double that and write down a six, double that and so on like this: 0, 3, 6, 12, 24, 48, 96, ... Then write a four below each number, do the addition and then mark off one decimal place so it looks like **Figure 1**.

Mercury	Venus	Earth	Mars	????	Jupiter	Saturn	Uranus	Neptune	Pluto	← Planet
										← Names
0	3	6	12	24	48	96	192	384	768	
4	4	4	4	4	4	4	4	4	4	
0.4	0.7	1.0	1.6	2.8	5.2	10.0	19.6	38.8	77.2	← Bode
0.39	0.72	1.0	1.52	2.77	5.2	9.54	19.19	30.1	39.5	← Actual

Figure 1. Bode's Law appears to predict the planet's distances from the sun.

THE PLANETS

At that time, 240 years ago, only six planets (Mercury, Venus, Earth, Mars, Jupiter, and Saturn) were known and Bode's Law made very close approximations of their actual positions. But there was a gap in the sequence and this led Bode to predict the existence of another planet between Mars and Jupiter. This turned out to be the location of the (then unknown) asteroid belt that may in fact be the remnants of a disintegrated planet. Then in 1781 Uranus was discovered and it also was just about where Bode's Law predicted it to be. The next two planetary discoveries, Neptune in 1846 and Pluto in 1930, were pretty far off the mark. But it is believed that they are no longer in their original locations due to their great distance from the Sun exerting less gravitational pull and their possible gravitational deflection due to passing comets.

OCTAVES, STANDING WAVES AND NODES

What does all of this have to do with music theory? You might recall that octaves were found by doubling the frequencies for each new octave. Bode's Law incorporates an initial offset of four but, other than that, each value represents a doubling of the previous value — just like octaves. The question is, what is holding these planets into just these places? Remember that any musical note is a result of resonance and that resonance is a result of standing waves, which have nodes that remain stationary. The planets may be taking the path of least resistance by forming and residing along these resonance nodes.

MUSIC OF THE SPHERES, GRAVITY WAVES AND BLACK HOLES

What is it that is resonating? In ancient Greece the Pythagoreans talked of the Music of the Spheres. They actually believed that each planet produced its own note and that they all resonated together. They felt that at some level we should be able to hear this celestial music. In more modern times Albert Einstein predicted the existence of gravity waves. Scientists now believe these to be more than just a mathematical construct and are searching for ways to detect and measure them. Black holes, it is now believed, each "ring" with their own unique frequency at its fundamental mode of vibration. The gravity wave formed by this resonance will be able to tell us much about the otherwise unobservable black holes.

A QUANTUM WORLD

When quantum physics began to enter the mainstream it was difficult for people to accept the idea of a discontinuous physical world. Quantum mechanics wanted us to accept that something could exist here and here but not in the spaces between. Music theory offers examples of this same idea with standing waves and with the harmonic-overtone-series.

STRING THEORY

Now there is String Theory that says that everything can be explained as energy vibrating like little pieces and loops of string at various frequencies and in different modes. The latest evolution of this is Super Symmetry replacing the loop of string with little surfaces called *branes* that vibrate in 11-dimensional space. This is pretty difficult to visualize for those who live in a three-dimensional world, but just as quantum mechanics offered many breakthroughs once it was accepted, Super Symmetry might be the opening door to our next brave new world.

Music may, in fact, be the secret of the universe. Everything we think of as reality is made up of vibrating energies all resonating and humming away. The interactions of these energies may define the nodes where we are allowed to view this energy as matter. The music goes 'round and 'round and, for the time being, comes out here. So, enjoy the music and please stay tuned.

Roger Goodman is a musician, mathematician, punster, reader of esoteric books and sometime writer, none of which pays the mortgage. For that, he is a computer network guy for a law firm. He has been part of the Los Angeles old-time & contra-dance music community for over thirty years. While not a dancer, he does play fiddle, guitar, harmonica, mandolin, banjo & spoons. Roger has a penchant for trivia and obscure and sometimes tries to explain how the clock works when asked only for the time. He lives with his wife, Monika White, in Santa Monica.



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