

DIETUS ELBL

ESSAY · TRANSLATION

Mathematics and Music

German original: *Mathematik und Musik*

by Dietus Elbl

THIS ESSAY IN OTHER LANGUAGES

Deutsch · Français · Italiano

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This section deals with various connections between mathematics and music on the basis of two examples. Here too, the saying "everything vibrates" applies in principle, which describes the subject excellently in the comprehensive sense. Every atom, every molecule, every stone and mountain, whether human being or star, everything receives its form through resonant fields of vibration, whose nodal points of standing waves represent the anchors of our being.

The following slide shows this very impressively, the vibrating water droplet having been exposed to different frequencies which determine its form. *(More on the research of A. Lauterwasser can be found, among other places, on the internet)*



The fundamental patterns of vibration and harmonies relate to their abstract matrix, which, referred to the number system, leads over to the 2-3-5 system, which, as a natural image of the cosmic active forces, shows a threefold division and is closely interwoven with the tuning system of an octave.

MUSIC THEORY AND THE 2-3-5 SYSTEM

In music, the fifth is the fifth tone of the diatonic scale, counted from a keynote. After the octave with the frequency ratio of 1:2, the fifth with the frequency ratio of 1:1.5, or the twelfth with the frequency ratio of 1:3, is the interval that is easiest to tune. That is why music theory always made sure that all diatonic intervals can be tuned through steps of fifths and major thirds.

The **interval ratios** can therefore always be reduced to the factors

2^n (octave) 3^n (fifth) **and** 5^n (major third)

and traced back to them.

The number system likewise begins with the numbers 2-3-5 as the three basic forms of creation, as can be shown:

2	(1)	3	(2)	5
4	(2)	6	(1)	7
8	(1)	9	(2)	11
10	(2)	12	(1)	13
14	(1)	15	(2)	17
16	(2)	18	(1)	19
				etc.

The distances between the three columns of numbers are in each case ± 1/±2 and form a dynamic structure, symmetrical about its centre. *(see also the text: on the solution of the Riemann hypothesis)*

The numbers 2, 3 and 5 also have primary significance in the **Kabbalah**, for the Kabbalist tries to derive the origin of the universe and its laws from the symbolism of numbers. He regards the human being numerologically as follows:

2 (divine will) + **3** (matter) = **5** (quinta essentia)

The human being is closely connected with the number 5 and the pentagram *("Five is the number of the soul" according to F. Schiller)* and has five fingers, which connects him with the **quintessence** of creation, which is to be regarded as the mediator between microcosm and macrocosm.

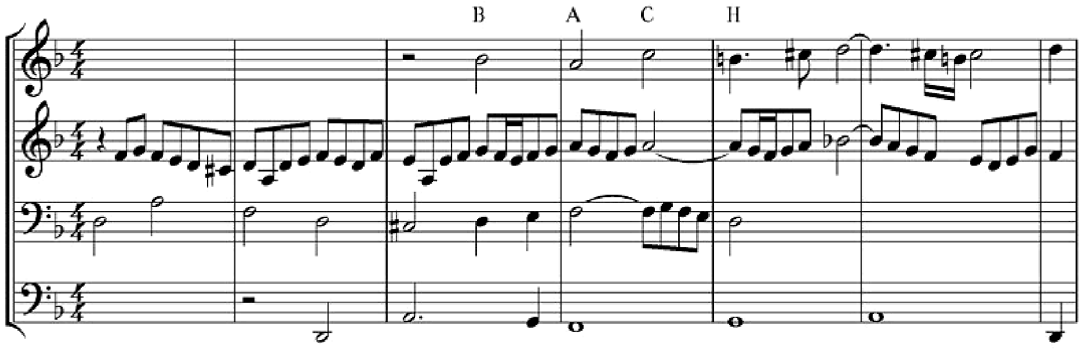
The knowledge of numbers and of the forces inherent in them, which they symbolise, has also led many musicians of all genres to lay out their music "mathematically". As an example, I would like to present here some notes on the works of J. Sebastian Bach and Bob Dylan, whose music is seemingly of opposite character, while the world view behind it and the handling of numbers as spiritual, archetypal building blocks run parallel or are identical.

In The Art of Fugue, Bach not only set his name to music (the sequence of notes b-a-c-h) but created a highly complex work which builds on the **number 14** and, in countless variations *(compare in this regard the Crowley Tarot and the 14th card "Art")*, illustrates the eternal becoming and passing away (crab canon etc.).

Johann Sebastian Bach - *The Art of Fugue*

JOHANN SEBASTIAN BACH – THE ART OF FUGUE

This work is one of his most revealing with regard to self-portrayal and is connected with the number 14 *(and with the philosophers' stone)*.



Excerpt, Contrapunctus XIV, quadruple fugue

The Art of Fugue contains 14 fugues, and the 14th of them is **Contrapunctus 14**, in which the name **Bach** appears as a musical theme. With this fugue Bach's creative work also ends; he left it "unfinished" to posterity and died while working on it. His notation ends with the 239th bar, which is only fragmentarily written down.

So there are 238 complete plus 1 incomplete bars in Contrapunctus 14, which in turn leads to Bach's "signature" and the letters B – A – C – H or the numerical values 2 – 1 – 3 – 8.

If one considers The Art of Fugue as a whole, it contains 1750 bars, assuming that Bach deliberately "withheld" from the knowing 33 bars which complete Contrapunctus 14. These 1750 bars correspond to the year of Bach's death and link his work with a saying of Christian Rosenkreutz:

> *"This compendium of the universe I made in my lifetime to be my tomb"*

and also recalls the crab canon, in which the course of time is reversed.

The Art of Fugue - structure

Fugue I – IV:	0372	bars
Fugue V – XIV:	1378	bars
Canon I – IV:	0372	bars
	1750	bars

Contrapunctus XIV has 239 + ***33*** bars

1378 is the year of birth of Christian Rosenkreutz: (1377 = 9 *153)

1750 is the year of death of Johann Sebastian Bach

The following contribution from our own time deals with the power and potency of the odd numbers and their application in music. It is presented by way of a short account from the autobiography of Bob Dylan, one of the most important musicians of the 20th century.

BOB DYLAN – THE POWER OF THE ODD NUMBERS

In most ancient cultures the odd numbers are the expression of the male, expansive principle and, in the physical context, are linked with kinetic energy, which *moves* things, whereas the female numbers, as potentials, indicate the resting aspects of the matrix. Seen in this way, the following contribution is easy to interpret:

Excerpts from: *"Chronicles", volume one* by B. Dylan, Simon & Schuster 2004)



[The English excerpts from "Chronicles" are not reproduced here. They can be found in the original version of this essay on zahlen.cc.]

The last sentence refers to the spiritual basis of physical creation, which, with emotion and intelligence, shows two mirror images of the original and unified magnetic source ("God"). Thus the artist here attempts to join the divine or immaterial parts (harmony, number) into a physical edifice (song), in order to let the beauty of pure spirit become transparent in creation. The almost infinite variations of music prove to be products of the cosmic building blocks in the form of numbers and their relationships, which manifest the state of being of unmoved rest.

If we only consider that every tone reaches us out of silence, it becomes clear that the music of the unheard is also the birthplace of all possible songs not yet written. In this sense the sound of silence is the most comprehensive music of the universe and the most immediate expression of divine being. Parts of these soundless sounds can be found in the chapter on "the silent sound of consciousness".

I would like to end here with a German and romanticising version of the English song "Mississippi" by B. Dylan, whose theme is the basic mood of the human being on his way through being.

MISSISSIPPI (BOB DYLAN)

[The English lines of the song are not reproduced here and are each indicated by [...]. They can be found in the original version of this essay on zahlen.cc. What follows is Dietus Elbl's German version.]

[...]

Every moment is a walk on the knife's edge - carefully! - if we do not want to lose our balance ... for nothing lasts forever, and death is waiting.

[...]

The older we grow, the closer we come to the time that bends and condenses,
holds us fast, and while with pain and heart we complete the preformed path,
she smiles, she who knows about us.

[...]

Life is like a great city, wild and untamed, free and cultivated at the same time.
But who would open himself unprotected to the madness? Enticing calls sound from every alley,
they turn our heads, and we find ourselves again in the almost endless throng of artificial needs that exhaust our soul.

[...]

And we are caught in its core, a ray of light still keeps us alive...
Memory sweeps us away, towards our home.

[...]

Because we are made of flesh and blood, we resemble our mother. Her breasts will nourish us all our lives, and her milk tastes sweet. Since I have been here, in the thicket of city life, the artificial architecture of unknowing minds, I have lost my eyesight, but my soul, she knows of you, oh Lord.

[...]

We come into the world naked and naked we set out to return to where we came from. I no longer own anything, no goods and possessions, no personal history ... what remains, faithful and serene - is my path, which I love.

[...]

Blazing heat and flaming smoke of the heavens drench the earth with pain.
But there is nothing you need to know, and nothing I require.
Because my body and its needs have entered into the heavenly kingdom, my eyes remained behind to serve life - as an upright witness.

[...]

Whatever I tell you, darling, fades in the shadow of your fragrant grace.
It makes the deer in the forest freeze, and the dreaming waters, rippling, mirror your knowing soul.

[...]

And in a meander of the wide river a whirlpool has formed, and there I got caught in the current. When the water carried me off again - a part of me stayed stuck, - to you.

[...]

Outside it is cold, and the reaper roams about. In the backyard cold mists have reached the window, and when the gusts of the storm rattle the front door, my thoughts wander to you, and I know everything you will say in advance, for my truth has taken your truth into itself forever in a loving kiss.

[...]

My soul went away for a brief moment, and in the gap between the worlds your face appeared. A warm gust of air arose and nestled excitedly into your loose hair, and the tenderness of the sun-fresh day glistened like a dewdrop on your velvety skin.

[...]

In autumn the birds of passage move away, and a general restlessness spreads. The leaves rustle underfoot and the transparency of the steel-blue sky makes the course of the world pause for a moment. Ethereal purity fills me, and approaching death transforms me into its very own essence - nothingness.

[...]

The die is cast. The path we walked was stony and we have hurt ourselves. I did not want it either - just as you did not want it - as it happened.....has.

[...]

Life is strange, and no day is like another. I am not I, and you are not you...when the morning announces today, I will be old and young at the same time.

[...]

Yet wherever I go, without you I am not. The unbridled urging of my heart forces me to my knees, and I want to raise my eyes to heaven, which you are for me.

[...]

Because you are Venus, oh mother, I gave my life away, on the day when the night sky in all its splendour - to me! - and who am I to deserve this? - revealed its great radiant secret.

[...]

The sweetness of ripe cherries on the tree becomes a playground for all birds whose wings are free, and yet! - how could it be otherwise - in flight they ever create anew the golden cage of their existence.

[...]

My body is tired, and the aching bones thirst for rest. The outside world has nothing to offer that refreshes my soul, and the creeping poison of its dishonourable dealings gnaws at my being.
In the face of the yawning abyss, the power of the present transforms past and future into utter insignificance.

[...]

When nothing remains behind and everything, set free, takes leave of the long journey's duration, my heart rejoices, for it unites with lived memory in a passionate embrace.

[...]

Many footsteps resound through the night. An almost endless column of citizens on the way to a goal that they have perhaps already reached - long before they set out.
But the body demands its rights, and whoever does not go never arrives.

[...]

Stay by my side, confidante of my heart, do not leave me!
It looks as if the sky were clearing, - now! - I want to believe it.

[...]

Standstill! - I sensed it - it is up to me. The rain has eaten small holes
into my wounded skin ... through their pores my heart now breathes.

[...]

Daybreak awaits us with a greeting full of light - Glück auf!
- say that you love me - transform me!

[...]

The power of infinity in its deep blackness has convinced me completely.
The way back is blocked, but the reflection of my spark of life shines on in all those things I loved - to which I have returned.

[...]

...for God let me taste for a brief moment the golden nectar of his most original being - who could have resisted?

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DESIGN AND REALISATION **LOTBLICK**