2008 TAIWAN INTERNATIONAL SCIENCE FAIR

CATEGORY : Mathematics

PROJECT : Mathematics in Music

AWARDS : Mathematics Third Award

SCHOOL : The G.V Rassohin Ukhta Technical Lyceum

FINALISTS : Tatiana Kamenshchikova

COUNTRY : Russian Federation

Taiwan International Science Fair 2008

ABSTRACT

CATEGORY：Mathematics
TITLE：Mathematics in Music
NAME：Tatiana Kamenshchikova
COUNTRY：Russia

Mathematics and music are two poles of human culture. Listening to music we get into the magic world of sounds. Solving problems we are immersed in strict space of numbers and we do not reflect that the world of sounds and space of numbers have been adjoining with each other for a long time. Interrelation of mathematics and music is one of the vital topics. It hasn't been completely opened and investigated up to now. This is the point why it draws attention of a lot of scientists and mathematicians to itself.

This is the point why it draws attention of a lot of scientists and mathematicians to itself. Having considered the value of these two sciences, it seems to us that they are completely non-comparable. In fact can there be a similarity between mathematics – the queen of all sciences, a symbol of wisdom and music – the most abstract kind of art? But if you peer deeply into it you can notice that the worlds of sounds and space of numbers have been adjoining with each other for a long time.

In the work I will try to establish the connection between mathematics and music and to find their common elements, to analyze pieces of music with the help of laws and concepts of mathematics to find a secret of mastery of musicians using mathematics and also to investigate the connection of music with mathematics with the "research part". They are my own calculations and researches which are an integral part of the work. The connection of mathematic and music is caused both historically and internally in spite of the fact that mathematics is the most abstract of sciences and music is the most abstract kind of art.

V. Shafutinskiy, I. Matvienko, m. Fadeev, K. Miladze, Dominik the Joker – modern composers of the XXI century – have used the golden proportion only in 4% of their pieces of music and more often in romances or children's songs. I have revealed this fact after investigating their pieces of music of different genres. However there is a question: why does modern music attracts all of us more but the

classics is being forgotten?

Investigating connection between mathematics and music I had come to the conclusion that the more deeply the piece of music gives in to the mathematical analysis, to research and submits to any mathematical laws, the more harmonious and fine its sounding is, the more it excites human soul. Besides I am convinced that many important, interesting and entertaining things have not been opened in this field. We can safely continue our research of these things. I think that I have managed to lift a veil over mathematics in music, to find something common for apparently incompatible science and art.

In due time English mathematician D. Silvestre called music as mathematics of feelings, and mathematics – as music of intellect. He expressed hope that each of them should receive the end from the part of the other one. In the future he expected the occurrence of a person in which Beethoven and Gauss' greatness would unite.

Terms 'science' and 'art' practically didn't differ during far times of antiquity. And though roads of mathematics and music have gone away since then music is penetrated with mathematics and mathematics is full of poetry and music!

評語

1) “Mathematics in Music” encompasses a large area. One could give a whole semester’s course devoted just to this one single topic. Unfortunately, the author has too short a time to cover the exploration in this science fair presentation.
2) Russians have a fine tradition of music. Russians have a fine tradition of mathematics. It is therefore natural to link these two areas together. In the world of free thinking we ought to encourage students to link Science and Culture in science fair projects. Taiwan International Science Fair takes pride in making the event a truly “international” exchange. This project serves a fine example in reaching the goal.