

What Does Math Sound Like?

an anecdotal study

The solicitation:

Hello fellow mathletes,

I was hoping you could take a few minutes and help me answer this strange sort of math question I've been pondering lately. If math was music, what music would it be? Of course there's no right answer, and of course it depends on which type of math. I want to collect everyone's responses, based on the following format:

- a. type of math: a field of math, a course you're taking, or a topic (eg. Algebraic Geometry, tensor products)
- b. corresponding type of music: a genre, an artist, a song (eg. Mongolian throat singing, the Darth Vader theme)
- c. optional short explanation of correlation (eg. 'because it makes me feel like I'm on a different planet', 'because it reminds me of the evil empire')

Answer as many times as your imagination permits.

The responses:

1.

General Topology: Mellow jazz, e.g. Miles Davis - Kind of Blue, or stuff by Brad Mehldau
Why: I choose jazz because, for one, I have an ear for it and enjoy it intently. But more importantly, it exhibits many of the characteristics that make math what it is. Math is interesting because it's about using creativity in thought paired with the knowledge we already have to come up with new interesting ideas. So if math were music, it certainly wouldn't be some highly produced studio track mixed for radio play.

As for my choice for General Topology in particular, I figure this is a very foundational area of mathematics, and so naturally the music reflecting it would be minimal, yet elegant.

Differential Geometry, PDE: Fusion. In particular, Brecker Brothers, Marcus Miller, Freddie Hubbard - Red Clay, Vital Tech Tones
Why: Because in short, these topics draw from many areas and so naturally I would imagine the music reflecting them to be more modern, involving electric instruments, having more modern chordal progressions, and so forth.

Algebra at the lvl of 504-506: Hmm, probably blues e.g. John Lee Hooker, Buddy Guy, Robben Ford, Albert King
Why: I might have also put something highly abstract and slightly cacophonous like Miles Davis: Bitches Brew, but I figure that would have more to do with my frustration on Tuesday trying to finish the

homework than the actual math itself. So I figure blues fits algebra well, because at its surface it seems relatively simple, but the more you listen, you become aware of many intricate nuances that have become integral to the style.

2.

Algebra sounds like Indonesian Gamelan music. Gamelan music has interweaving patterns on such a range of time scales. There are lightning-fast melodies that must be played by two people, one fitting in the gaps of the other; simultaneously there are a few levels of more 'comprehensible' melodies; simultaneously there are large two-minute melodic rhythm cycles being marked by gongs. It all fits together so tightly, and because the spectrum is so wide it feels like something cosmic is being forced into a form we can experience (sounds in time), in such a way that we see, and push, the limits of our perception and awareness.

Smooth Manifolds sound like house music. So much effort is put into rebuilding an atmosphere or space up from the most fundamental building blocks, and the result is disappointingly vapid. You hear it and think, "Yeah, this is music, and it's kind of interesting, but it didn't tell me anything I couldn't have figured out from just listening to the silence of the most mundane space".

Calculus is like driving in the car and turning on the radio to listen to some music. Time goes by and you vaguely realize you don't like the music they're playing, and there's so many ads, and the DJs voice is kind of annoying, and you wonder why you didn't turn off the radio earlier. You're simultaneously wishing that the radio wasn't on at all and that some really great song would come on and validate all the time you've spent listening to crap. So of course you keep listening.

3.

Transcendental Extensions - The Pi Soundtrack (hahahaha... It's actually just good doing math music.)

Algebraic Extensions - "Lateralus" (the song not the album) by Tool (I couldn't stop listening to this song while doing our algebraic extension homework. I don't know why, it does have a sort of transcendental meditation theme thing going on in the lyrics of the song, i don't think this is why I wanted to listen to it though, I barely ever listen to lyrics. Also, a fun fact about this song is that it has a time sequence of the first few terms of the Fibonacci sequence over and over. 1 1 2 3 5 8 5 2 3 1 1 2 3 5 8 5 ...)

Not exactly what you asked, but general music that I like to do math to:

Aphex Twin - Selected Ambient Works (all volumes), windowlicker

UNKLE - Never, Never, Land

DJ Spooky - Riddim Warfare, Modern Mantra, and The Synthetic Fury EP, Subliminal Minded EP

Radiohead - I Might Be Wrong: Live Recordings, Kid A, and Amnesiac

Beethoven/Bach and classical in general.

The Good The Bad and The Queen

4.

Math is like a mash-up. You work on something and it seems like it stands on its own. One day, somebody connects it with something that you thought was totally unrelated, yet they seem to go together perfectly.

Here's a specific one:

The five lemma is like the Beatle's song that starts "You never give me your money/ You only give me your funny paper." Maybe I feel that way because the song is based on the circle of fifths. Once you here a verse, you know the predictable fall and rise that's going to happen—you just need to chase the notes up and down at the right moments.

5.

Mahler's 8th Symphony for Algebraic Topology: any decent performance requires a lot of machinery; and

Free Jazz for Manifolds: most of the hard work is done by the rythm section (the textbook), and supposedly there are a lot of different ways to do things, but you still get frowns from the audience when you screw up.

6.

Cyclic groups are a bit like playing scales on an old harpsichord (this one should be obvious).

Representation theory always seems a little like Queen to me, all of those epic sounding theorems and powerful chord like machinery developed simple to to analyze a set of modules based off of groups. The basics pulled up into a mighty and majestic new level.

Algebraic dynamics, and this I don't even pretend to understand, has always been punk rock to me. That underlying flavor of ergodic mixing and the associated buzzword of 'chaos' make this discipline feel like its making money for the same establishment its throwing dirt int he face of. They also both have a good underlying beat.

7.

these days, I feel like I've been only listening to a radio which is not tuned well, that I hear fragments of something, but the noise is so loud that I can't hear. Sadly, that's what I have been listening these days, and it's hard to answer your question.

For me though, it's happens more that music reminds me of math than math reminds me of music. Such as when I was listening to latin jazz the other day, I though it could be algebra. (by the way, real analysis sounds definitely like chopin)

8.

I associate math with various synthesized music, most often old video game music or movie soundtracks. Specifically, analysis often goes with softer themes like Arcanum, mostly because I find it takes a calm mind to survive the epsilon chasing. Algebra (and for some reason, modules in particular) tend to go with more upbeat and methodical tracks. Algebraic geometry has been matched with the Mechwarrior 2 soundtrack in recent weeks, because it's purposeful and powerful, but just a little tribal and mysterious.

9.

a. the snake lemma
b. carrousel music
c. you just chase things up and down and round and round untill everything is as it should be

a. probability
b. heavy metal
c. its not particularly beautiful, but you just have to pound away until you get kinda into it.

10.

I probably associate math with slow classical music, symphony or violin. As for particular piece - my favorite Adagio in G Minor by Tomaso Giovanni Albinoni. It is sad, but at the same time bright. It helps me to keep having a hope even when I am totally lost in what I am doing. It is hard for me to relate it to any particular type of math, but I am working somewhere in algebra and algebraic/differential geometry.

I also associate Rammstein to low level grading (1xx-4xx). Their music agrees with my desire to tear into little pieces and throw away some messy papers...

5xx grading goes better with classical, just as other real math. Piano concertos by Sergei Rachmaninoff are a good choice.

Luke Wolcott
March 2010
www.forthelukeofmath.com