Daily life of a person who studies mathematics

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About my research

- I study p-adic differential equations.
- Roughly speaking: the objects we study are linear differential equations as follows:

$$\begin{cases} \dfrac{dy_1}{dt} = a_{11}(t)y_1 + \cdots + a_{1n}(t)y_n \\ \vdots \\ \dfrac{dy_n}{dt} = a_{n1}(t)y_1 + \cdots + a_{nn}(t)y_n \end{cases}$$

where these functions are defined over p-adic fields instead of real numbers or complex numbers.

Get start with $\mathbb{Q}$

- Let us fix a prime number $p = 2, 3, 5$ …, we can define a new kind of absolute value on $\mathbb{Q}$ as follows:
- For a rational number $\frac{a}{b}$, it can always be written as $p^k \frac{a'}{b'}$, where k is an integer, a' and b' are both prime to p. Then we define the absolute value of $\frac{a}{b}$ as p^{-k}.
- For example, if we fix $p = 2$, then $\frac{36}{43} = 2^2 \frac{9}{43}$, and its absolute value is $\frac{1}{4}$.

$\mathbb{Q}_p$

- This is really an absolute value!

1. $|a| \geq 0; |a| = 0$ if and only if $a = 0$.
2. $|ab| = |a||b|$.
3. $|a + b| \leq \max\{|a|, |b|\}$

- There are "holes" in $\mathbb{Q}$. We add points to fill these holes to get $\mathbb{Q}_p$.

About my hobbies

Classical music (Debussy, Beethoven, Chopin, Strauss II)

Photography

Games

Similarities Shared by France and Japan

- Natural Scenery
- Multi-culture

Thank you for listening