$\mathcal{D}$-modules

Noobs

February 12, 2024

> Most men will not swim before they are able to. Is that not witty? Naturally, they won't swim! They are born for the solid earth, not for the water. And naturally they won't think. They are made for life, not for thought. Yes, and he who thinks, what's more, he who makes thought his business, he may go far in it, but he has bartered the solid earth for the water all the same, and one day he will drown.
>
> Hermann Hesse, *Steppenwolf*

Abstract

We noobs are trying to understand the basics about $\mathcal{D}$-modules; in particular, the Riemann–Hilbert correspondence. Later on some applications will be discussed.

1 Schedule

Lecture 1 $\mathcal{D}$-modules and connections, after P Deligne.

Speaker: 李心宇

Lecture 2 $\mathcal{D}$-modules and six functors.

Speaker: 付艺淯

Lecture 3 Kashiwara's theorem.

Speaker: 任建宇

Lecture 4 Singular support. Holonomicity.

Speaker: 李宣佑

Lecture 5 Holonomicity (cont'd).

Speaker: 李宣佑

Lecture 6 Integrability of singular support, after O Gabber.

Speaker: 李心宇

Lecture 7 Gabber's theorems (cont'd).

Speaker: 李心宇

Lecture 8 Holonomic $\mathcal{D}$-modules with regular singularities.

Speaker: 梁石易新

Lecture 9 Riemann–Hilbert correspondence.

Speaker: 梁石易新

Lecture 10 Localisation de $\mathfrak{g}$-modules, after Beilinson–Bernstein.

Speaker: 李心宇

Lecture 11 Localisation de $\mathfrak{g}$-modules (cont'd).

Speaker: 李心宇

Lecture 12 Nearby and vanishing cycles.

Speaker: 许福临

Lecture 13 Singularity theory.

Speaker: 蒋昕童

Lecture 14 Singularity theory (cont'd).

Speaker: 蒋昕童

References

[Ber83] J Bernstein. Algebraic theory of D-modules. *preprint*, 1983.

[Bor87] A Borel. *Algebraic D-modules*. Academic Press San Diego, CA, 1987.

[Gin98] V Ginzburg. Lectures on D-modules. *preprint*, 1998.

[HT07] R Hotta and T Tanisaki. *D-modules, perverse sheaves, and representation theory*. Springer Science & Business Media, 2007.