McKay correspondence

Gérard Gonzalez-Sprinberg

This course is an introduction to some geometrical aspects of the McKay correspondence mainly on the case of dimension two, relating the representation theory of a finite subgroup G of $SL(2, \mathbb{C})$ and the minimal resolution of the quotient singularity $\mathbb{C}^2/G$.

It will be presented the principal ingredients in this case, such as the regular polyhedra, the associated rotation and binary polyhedral groups, finite subgroups of $SL(2, \mathbb{C})$, the rational double points also called Klein or DuVal singularities, desingularizations, dual graphs of exceptional divisors, fundamental cycles. Followed by a description of a geometric construction of the correspondence and some generalizations.

The prerequisites are basic algebraic geometry and classical representation theory of finite groups.

Bibliography

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F. Klein, *The icosahedron and the fifth degree equation*, (1884) Dover reprint 1956.

J. McKay, *Graphs, singularities and finite groups*, Proc. Symposia Pure Math. 37 (1980), 183-186.

H. Pinkham, *Singularités de Klein*, in Séminaire sur les singularités de surfaces, Springer LNM 777, 1980.

Further Reading

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