Invariants of plane curve singularities

Supervisor: Aline Zanardini
a.zanardini@math.leidenuniv.nl

The study of singular points of plane curves lies at the intersection of many different branches of mathematics and the interaction between these different areas makes it a beautiful and rich subject.

Given an irreducible plane curve having an isolated singular point, the topological type of the singularity is defined as the topological type of a certain knot; or linked knot, in the case of reducible curves. The knot is obtained by intersecting the curve with a small three dimensional sphere around the singular point.

In this project, via many concrete examples, the student will learn how to compute several invariants associated to a plane curve singularity that are in fact complete invariants of their topological type.

A solid background in algebra and topology is desirable.

Suggested Bibliography

[1] E. Brieskorn and H. Knörrer. *Plane algebraic curves.* Modern Birkhäuser Classics. Birkhäuser/Springer Basel AG, Basel, 1986. Translated from the German original by John Stillwell, [2012] reprint of the 1986 edition.

[2] D. Eisenbud and W. Neumann. *Three-dimensional link theory and invariants of plane curve singularities*, volume 110 of *Annals of Mathematics Studies.* Princeton University Press, Princeton, NJ, 1985.

[3] C. T. C. Wall. *Singular points of plane curves*, volume 63 of *London Mathematical Society Student Texts.* Cambridge University Press, Cambridge, 2004.