CO 330, LECTURE 9 SUMMARY

FALL 2017

Summary

Today we proved the Lagrange Implicit Function Theorem.

The idea of this proof is to work with a formal residue operator, that is $[x^{-1}]L(x)$ where $L(x)$ is a formal Laurent series. This particular coefficient is especially well-behaved for calculations involving derivatives and compositions and things like that. That's just what we need. If you've done some analysis and know how nice and how useful residues are, it shouldn't be too surprising that their formal version is also useful.

Having said that the proof isn't very combinatorial in the sense that there isn't a nice construction or interpretation. If you would like to see a more combinatorial proof see chapter 13 of the course notes (but we won't cover it in this class, so you aren't responsible for it.)

References

This proof is from chapter 8 of the course notes (Lemmas 8.3, 8.4 and 8.5 along with the proof itself on pages 78 and 79).