

Normal forms for strongly hyperbolic logarithmic transseries and Dulac germs

Dino Peran

Abstract

In this talk we obtain formal normal forms for strongly hyperbolic logarithmic transseries $f=x^a+\dots$, $a>1$, using fixed point theorems. We show that we can obtain formal normalizations algorithmically by iterating suitable logarithmic transseries taken as an initial condition. Using this result we obtain formal normalizations of strongly hyperbolic Dulac germs. The main goal is to find analytic normalizations of strongly hyperbolic Dulac germs. Therefore, we first present result about analytic normalizations of analytic germs on suitable complex domains, having strongly hyperbolic asymptotic bounds, and then we combine these formal and analytic results to prove that the analytic normalization of a strongly hyperbolic Dulac germ has the formal normalization as its asymptotic expansion. Thus, the analytic normalization of a strongly hyperbolic Dulac germ is again a Dulac germ. This result can be viewed as an analogue of the classical *Böttcher theorem*.