Abstract

We study the problem of finding algebraically stable models for non-invertible holomorphic fixed point germs $f:(X,x_0)\to(X,x_0)$, where X is a complex surface having x_0 as a normal singularity. We prove that as long as x_0 is not a cusp singularity of X, then it is possible to find arbitrarily high modifications $\pi\colon X_\pi\to(X,x_0)$ such that the dynamics of f (or more precisely of f^N for N big enough) on X_π is algebraically stable. This result is proved by understanding the dynamics induced by f on a space of valuations associated to X; in fact, we are able to give a strong classification of all the possible dynamical behaviors of f on this valuation space. We also deduce a precise description of the behavior of the sequence of attraction rates for the iterates of f. Finally, we prove that in this setting the first dynamical degree is always a quadratic integer.