

**Analytic properties of the complete formal normal
form for the Bogdanov–Takens singularity**

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In our previous paper a complete formal normal forms for germs of 2-dimensional holomorphic vector fields with nilpotent singularity was obtained. That classification is quite nontrivial (7 cases), but it can be divided into general types like in the case of the elementary singularities. One could expect that also the analytic properties of the normal forms for the nilpotent singularities are analogous to the case of the elementary singularities. This is really true. In the cases analogous to the focus and the node the normal form is analytic. In the case analogous to the nonresonant saddle the normal form is often nonanalytic due to the small divisors phenomenon. In the cases analogous to the resonant saddles (including saddle–nodes) the normal form is nonanalytic due to properties of some homological operators associated with the first nontrivial term in the orbital normal form.