Stróżyna, Ewa
Normal forms for germs of vector fields with quadratic leading part. The polynomial first integral case. (English) Zbl 1321.05134
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Summary: We study the problem of formal classification of the vector fields of the form $\dot{x} = ax^2 + bxy + cy^2 + \ldots$, $\dot{y} = dx^2 + exy + fy^2 + \ldots$ using formal changes of the coordinates, but not using the changes of the time. We focus on one special case (which is the most complex one): when the quadratic homogeneous part has a polynomial first integral. In the proofs we avoid complicated calculations. The method we use is effective and it is based on the method introduced in our previous work concerning the Bogdanov-Takens singularity.

MSC:

05C38	Paths and cycles
15A15	Determinants, permanents, traces, other special matrix functions
05A15	Exact enumeration problems, generating functions
15A18	Eigenvalues, singular values, and eigenvectors

Keywords:

singularity of plane vector field; formal orbital normal form; non-orbital normal form

Full Text: DOI

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