

## On the Numerical Analysis and Visualisation of Implicit Ordinary Differential Equations

Elishan Braun<sup>1</sup>, Werner M. Seiler<sup>2</sup>, Matthias Seiß<sup>2</sup>

We discuss how the geometric theory of differential equations [4] can be used for the numerical integration and visualisation of implicit ordinary differential equations, in particular around singularities of the equation [3]. The Vessiot theory [2] automatically transforms an implicit differential equation into a vector field distribution on a manifold and thus reduces its analysis to standard problems in dynamical systems theory like the integration of a vector field and the determination of invariant manifolds. For the visualisation of low-dimensional situations we adapt the streamlines algorithm of Jobard and Lefer to 2.5 and 3 dimensions. A concrete implementation in Matlab is presented [1].

**Keywords:** Implicit ordinary differential equations, Vessiot distribution, jet bundles, singular points, invariant manifolds

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### References

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<sup>1</sup>Departimento di Matematica e Fisica  
Università degli Studi Roma Tre  
Largo San Leonardo Murialdo 1, 00146 Rome, Italy  
elishan@hotmail.de

<sup>2</sup>Institut für Mathematik  
Universität Kassel  
Heinrich-Plett-Straße 40, 34132 Kassel, Germany  
[seiler,mseiss]@mathematik.uni-kassel.de