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## *Nonlinear analysis as a calculus*

We have developed a calculus [1] that allows us to compute asymptotic expansions of solutions to equations that are polynomials over variables and derivatives, as well as to systems of such equations. This calculus is applicable to equations of any type: algebraic, ordinary differential and partial differential equations, as well as to their systems. The calculus is based on algorithms of power geometry: (a) isolation of truncated equations consisting of all leading terms, and also (b) power, (c) logarithmic and (d) normalizing coordinate transformations. The software required for this has already been developed. We consider one algebraic equation [2] and one partial differential equation [3] to explain the methods.

[1] Bruno A. D. Nonlinear Analysis as a Calculus // London Journal of Research in Science: Natural and Formal. 2023. Vol. 23, no. 5. P. 1-31 ; open access at:
https://journalspress.com/LJRS_Volume23/Nonlinear-A nalysis-as-a-Calculus.pdf

[2] Bruno A. D., Azimov A. A. Parametric expansions of an algebraic variety near its singularities // Axioms. 2023b. Vol. 12, no. 5. P. 469 ; open access at:
https://doi.org/10.3390/axioms12050469

[3] Bruno A. D., Batkhin A. B. Asymptotic forms of solutions to system of nonlinear partial differential equations // Universe. 2023. Vol. 9, no. 1. P. 35 ; open access at:
https://doi.org/10.3390/universe9010035

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