Nonformal solutions to an ODE

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Abstract

We consider a nonlinear ordinary differential equation $f(x, y, y', \dots, y^{(n)}) = 0$, where the function $f(x, y, y', \dots, y^{(n)})$ is a polynomial of its variables $x, y, y', \dots, y^{(n)}$. Let this equation has a formal solution in the form of Laurent series with finite main part. We discuss sufficient conditions of convergence of such series.