On resurgence, normal forms and mould calculus

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Resurgent power series naturally appear when trying to normalize such an elementary differential equation as $x^2\,dy = (x+y)\,dx$, which is the simplest example of saddle-node singularity. I will discuss the formal classification of saddle-node singularities and illustrate on that case the use of Ecalle's resurgence theory and mould calculus. The latter is a powerful combinatorial tool which allows to deal with more complicated normal form problems.