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Resurgence and Non-perturbative Physics

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Resurgent asymptotics unifies perturbative and non-perturbative expansions into a single object, a trans-series, thereby revealing a surprisingly deep network of relations between perturbative and non-perturbative physics. This is a general mathematical formalism with roots in work of Stokes, Dingle and Ecalle, and which has many applications in physics. I will describe the basic ideas underlying resurgence, and illustrate with examples from non-linear differential equations, quantum mechanical spectral problems, and partition functions in matrix models and quantum field theory.

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