Dynamical systems solvable by algebraic operations

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In this talk I shall focus on systems of nonlinear Ordinary Differential Equations, and introduce the notion of their *solvability by algebraic operations*: implying that their *general* solution, considered as a function of *complex time*, feature at most a *finite* number of *rational branch points*, or equivalently define a Riemann surface with a *finite* number of sheets. Some properties of these systems shall be reviewed, including the subclasses of them featuring such remarkable properties as *isochrony* or *asymptotic isochrony* (as functions of *real* time). Techniques to identify such systems shall be reviewed, and several examples reported, including *new* classes of such systems.

References: F. Calogero, *Isochronous Systems*, Oxford University Press, 2008 (264 pages, paperback 2012); *Zeros of Polynomials and Solvable Nonlinear Evolution Equations*, Cambridge University Press, 2018 (168 pages). F. Calogero and F. Payandeh, "Polynomials with multiple zeros and solvable dynamical systems including models in the plane with polynomial interactions", J. Math. Phys. **60**, 082701 (2019). F. Calogero, R. Conte and F. Leyvraz, "New *solvable* systems of two autonomous first-order ordinary differential equations with purely quadratic right-hand sides" (in preparation).