



A Non-Profit Association of a Learned Society

International Society of Nonlinear Mathematical Physics

isnmp.de

A Talk at the 2nd ISNMP Conference

Bad Ems, 28 June to 4 July 2026

Regular Session:

Speaker: François Leyvraz (Universidad Nacional Autónoma de México, Cuernavaca, México)

Title: *The “goldfish” equations of motion for infinitely many particles*

Abstract: The “goldfish” equations, so named because of their striking beauty, are a system of N nonlinear ODE's, where N is an arbitrary integer. They can be solved exactly in a very simple manner, by transforming them to free motion using a transformation involving the transition from the set of *coefficients* of a polynomial to that of its *zeroes*. This paper aims to explore the possibility of extending this solution to the case in which N is infinite. The main difficulty involves the transition from polynomials to entire functions. Another approach using non-standard analysis, is left to future work.