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Fourier's Resolution of the Heat Equation by Transduction: A Contemporary Approach.

The paper explores the Leibnizian analytical style of calculus problem solving as an obstacle that Fourier (1768-1830) had to avoid a posteriori in his attempt to solve the heat problem. Leibniz's school seeks for an algorithmic, symbolical, and blind reasoning which "was based on a 'subversion' of the semantics in favour of a consistent formalism" (Mancosu 1996: 173), and was followed by d'Alembert (1717-1783), restricting mathematical analysis to continuous functions given by a single equation, in the old sense. Although Euler (1701-1787) 'tolerated' continuous curves with piecewise slopes and curvatures, he nevertheless restricted the acceptance of trigonometric series as representative basis of any function, a task in which Fourier successfully advanced, although its procedures were criticized by the physical-mathematical community of his time, as lacking in rigor and mathematical generality. We propose to show how Fourier solves the heat problem confronting this inherited tradition, from the application of what now call transduction (Visokolskis 2009, 2018, 2020), a non-deductive reasoning contributing to the construction of one or more hypotheses that explain the emergence of some creative insight, in response to a problem that motivates and drives the creative process.