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Abstract: Charles S. Peirce introduced in the late 19th century the notion of abduction as inference from effects to causes, or from observational data to explanatory theories. Abductive reasoning has become a major theme in contemporary logic, philosophy of science, and artificial intelligence. This paper argues that the new growing branch of applied mathematics called inverse problems deals successfully with various kinds of abductive inference within a variety of scientific disciplines. The fundamental theorem about the inverse reconstruction of plane functions from their line integrals was proved by Johann Radon already in 1917. The practical applications of Radon’s theorem and its generalizations include computerized tomography which became a routine imaging technique of diagnostic medicine in the 1970s.

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