

Padoa, Alessandro | Encyclopedia.com

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(b. Venice, Italy, 14 October 1868; d. Genoa, Italy, 25 November 1937)

mathematical logic, mathematics.

Padoa attended a [secondary school](#) in Venice, the engineering school in Padua, and the University in Turin, from which he received a degree in mathematics in 1895. He taught in secondary schools at Pinerolo, Rome, and Cagliari, and (from 1909) at the Technical Institute in Genoa.

Padoa was the first to devise a method for proving that a primitive term of a theory cannot be defined within the system by the remaining primitive terms. This method was presented in his lectures at Rome early in 1900 and was made public at the International Congress of Philosophy held at Paris later that year. He defined a system of undefined symbols is irreducible with respect to the system of unproved propositions when no symbolic definition of any undefined symbol can be deduced from the system of unproved propositions. He also said:

To prove that the system of undefined symbols is irreducible with respect to the system of unproved propositions it is necessary and sufficient to find, for each undefined symbol, an interpretation of the system of undefined symbols that verifies the system of unproved propositions and that continues to do so if we suitably change the meaning of only the symbol considered ["Essai ...," p. 322].

Although it took the development of model theory to bring out the importance of this method in the theory of definition, Padoa was already convinced of its significance. (A proof of Padoa's method was given by [Alfred Tarski](#) in 1926 and, independently, by J. C. C. McKinsey in 1935.)

In lectures at the universities of Brussels, Pavia, Bern, Padua, Cagliari, and Geneva, Padoa was an effective popularizer of the mathematical logic developed by [Giuseppe Peano](#)'s "school," of which Padoa was a prominent member. He was also active in the organization of [secondary school](#) teachers of mathematics and participated in many congresses of philosophy and mathematics. In 1934 he was awarded the ministerial prize in mathematics by the Accademia dei Lincei.

BIBLIOGRAPHY

I. Original Works. A list of 34 of Padoa's publications in logic and related areas of mathematics (about half of all his scientific publications) is in Antonio Giannattasion, "Due inediti di Alessandro Padoa," in *Physis* (Florence), **10** (1968), 309–336. To this may be added three papers presented to the Congres International de Philosophie Scientifique at Paris in 1935 and published in *Actualites scientifiques et industrielles* (1936): "Classes et pseudo classes," no. 390, 26–28; "Les extensions successives de l'ensemble des nombres au point de vue deductif," no. 394, 52–59; and "Ce que la logique doit a Peano," no. 395, 31–37.

Padoa's method was stated in "Essai d'une theorie algebrique des nombres entiers, precede d'une introduction iogidue a une theorie deductive quelconque," in *Bibliothèque du Congres international de philosophie*, Paris, 1900, III (Paris, 1901), 309–365. An English trans. (with references to Padoa's method) is in Jean van Heijenoort, ed., *From Frege to Godel: A Source Book in Mathematical Logic 1879–1931* (Cambridge, Mass., 1967), 118–123. Padoa's major work is "La logique deductive dans sa derniere phase de developpement," in *Revue de metaphysique et de morale*, **19** (1911), 828–832; **20** (1912), 48–67, 207–231, also published separately, with a preface by G. Peano (Paris, 1912).

II. Secondary Literature. There is no biography of Padoa. Some information on his life and work may be found in the obituaries in *Bollettino dell' Unione matematica italiana*, **16** (1937), 248; and *Revue de metaphysique et de morale*, **45** (1938), Apr. supp., 32; and in F. G. Tricomi, "Matematici italiani del primo secolo dello stato unitario," in *Memorie della Accademia delle scienze di Torino*, 4th ser., no. 1 (1962), 81.

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