Nazwisko KAC

Imiona MARK [MAREK] **Pseudonim** .....

Z domu .....

Data urodzenia 3.08.1914 **Miejscowość, kraj** Krzemieniec, Polska

Data śmierci 26.10.1984 **Miejscowość, kraj** Kalifornia, Stany Zjednoczone

Lat życia .....

Adres cmentarza .....

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Zawód matematyk **Tytuły naukowe** profesor

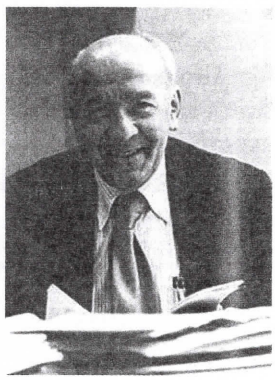
Rodzaj wojska ..... **Stopień wojskowy** .....

Odznaczenia .....

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Mark Kac (1914 Krzemieniec – 1984 Kalifornia) ukończył liceum w Krzemieńcu i studia matematyki na Uniwersytecie Jana Kazimierza we Lwowie. Był przedstawicielem lwowskiej szkoły matematycznej. W 1938 r. wyjechał do USA i pracował w Cornell University, Rockefeller University oraz University of Southern California. Miał wybitne osiągnięcia w teorii prawdopodobieństwa. Był członkiem Narodowej Akademii Nauk USA, Holenderskiej Akademii Nauk oraz Norweskiej Akademii Nauk. Był także laureatem Nagrody Jurzykowskiego.



Mark Kac

Mark Kac (/kɑːts/ *KAHTS*; Polish: *Marek Kac*; August 3, 1914 – October 26, 1984) was a Polish American mathematician. He was born to a Polish-Jewish family; their town, Kremenets (Polish: "Krzemieniec"), changed hands from the Russian Empire to Poland when Kac was a child.[1] His main interest was probability theory. His question, "Can one hear the shape of a drum?" set off research into spectral theory, with the idea of understanding the extent to which the spectrum allows one to read back the geometry. (In the end, the answer was "no", in general.)

Kac completed his Ph.D. in mathematics at the Polish University of Lwów in 1937 under the direction of Hugo Steinhaus.[2] While there, he was a member of the Lwów School of Mathematics. After receiving his degree he began to look for a position abroad, and in 1938 was granted a scholarship from the Parnas Foundation which enabled him to go work in the United States. He arrived in New York City in November, 1938.[3]

With the onset of World War II, Kac was able to stay in America, while his parents and brother who remained in Western Ukraine were murdered by the Germans in the mass executions in Krzemieniec in August 1942.[4]

From 1939-61 he was at Cornell University, first as an instructor, then from 1943 as assistant professor and from 1947 as full professor.[5] While there, he became a naturalized US citizen in 1943. In the academic year 1951–1952 Kac was on sabbatical at the Institute for Advanced Study.[6] In 1952, Kac, with Theodore H. Berlin, introduced the spherical model of a ferromagnet (a variant of the Ising model)[7] and, with J. C. Ward, found an exact solution of the Ising model using a combinatorial method.[8] In 1961 he left Cornell and went to The Rockefeller University in New York City. In the early 1960s he worked with George Uhlenbeck and P. C. Hemmer on the mathematics of a van der Waals gas.[9] After twenty years at Rockefeller, he moved to the University of Southern California where he spent the rest of his career.

Mark Kac



Born	August 3, 1914 Krzemieniec
Died	October 26, 1984 (aged 70) California
Residence	USA
Nationality	Polish
Citizenship	Poland, USA
Alma mater	Lwów University
Known for	Feynman–Kac formula Erdős–Kac theorem
Awards	Chauvenet Prize (1950, 1968) Birkhoff Prize (1978)
Scientific career	
Fields	Mathematics
Institutions	Cornell University Rockefeller University University of Southern California

Contents

Work

Reminiscences
Awards and honors
Books
See also
References
External links

Doctoral advisor	Hugo Steinhaus
Doctoral students	Harry Kesten William LeVeque William Newcomb Lonnie Cross Daniel B. Ray Murray Rosenblatt Daniel Stroock

Work

In his 1966 article with the title "Can one hear the shape of the drum" Kac asked the question whether two resonators ("drums") of different geometrical shapes can have exactly the same set of frequencies ("sound tones"). The answer was positive, meaning that the eigenfrequency set does not uniquely characterize the shape of a resonator.

Reminiscences

- His definition of a profound truth. "A truth is a statement whose negation is false. A profound truth is a truth whose negation is also a profound truth." (Also attributed to Niels Bohr)
- He preferred to work on results that were robust, meaning that they were true under many different assumptions and not the accidental consequence of a set of axioms.
- Often Kac's "proofs" consisted of a series of worked examples that illustrated the important cases.
- When Kac and Richard Feynman were both Cornell faculty, Kac attended a lecture of Feynman's and remarked that the two of them were working on the same thing from different directions. The Feynman-Kac formula resulted, which proves rigorously the real case of Feynman's path integrals. The complex case, which occurs when a particle's spin is included, is still unproven. Kac had learned Wiener processes by reading Norbert Wiener's original papers, which were "the most difficult papers I have ever read."[3] Brownian motion is a Wiener process. Feynman's path integrals are another example.
- Kac's distinction between an "ordinary genius" like Hans Bethe and a "magician" like Richard Feynman has been widely quoted. (Bethe was also at Cornell University.)
- Kac became interested in the occurrence of statistical independence without randomness. As an example of this, he gave a lecture on the average number of factors that a random integer has. This wasn't really random in the strictest sense of the word, because it refers to the average number of prime divisors of the integers up to N as N goes to infinity, which is predetermined. He could see that the answer was $c \log \log N$, if you assumed that the number of prime divisors of two numbers x and y were independent, but he was unable to provide a complete proof of independence. Paul Erdős was in the audience and soon finished the proof using sieve theory, and the result became known as the Erdős–Kac theorem. They continued working together and more or less created the subject of probabilistic number theory.
- Kac sent Erdős a list of his publications, and one of his papers contained the word "capacitor" in the title. Erdős wrote back to him "I pray for your soul."

Awards and honors

- 1950 — Chauvenet Prize for 1947 expository article[10]
- 1959 – member of the American Academy of Arts and Sciences
- 1965 – member of the National Academy of Sciences
- 1968 – Chauvenet Prize (and 1967 Lester R. Ford Award) for 1966 expository article[11]
- 1971 – Solvay Lecturer at Brussels
- 1980 – Fermi Lecturer at the Scuola Normale, Pisa

Books

- Mark Kac and Stanislaw Ulam: *Mathematics and Logic: Retrospect and Prospects*, Praeger, New York (1968) Dover paperback reprint.
- Mark Kac, *Statistical Independence in Probability, Analysis and Number Theory*, Carus Mathematical Monographs, Mathematical Association of America, 1959.[12]
- Mark Kac, *Probability and related topics in the physical sciences.* 1959 (with contributions by Uhlenbeck on the Boltzmann equation, Hibbs on quantum mechanics, and van der Pol on finite difference analogues of the wave and potential equations, Boulder Seminar 1957).[13]
- Mark Kac, *Enigmas of Chance: An Autobiography*, Harper and Row, New York, 1985. Sloan Foundation Series. Published posthumously with a memoriam note by Gian-Carlo Rota.[14]

See also

- Feynman–Kac formula
- Erdős–Kac theorem