

GUIDO FUBINI

Italian mathematician **Guido Fubini** (January 19, 1879 – June 6, 1943) was nicknamed “the small giant” because of his small stature and great mind and personality.

He made advances in both the applied and theoretical aspects of multivariable calculus. He is best remembered for the theorem that is named for him, which gave the necessary and sufficient conditions to be able to switch the order of integration of iterated integrals and for utilizing the results in mechanics and physics.



Fubini was born in Venice where his father was a mathematics teacher. At an early age the younger Fubini proved to be outstanding at mathematics. In 1896, he attended the Scuola Normale Superiore di Pisa, where he studied with Ulisse Dini and Luigi Bianchi, receiving his doctorate in 1900 for his thesis, “Clifford’s Parallelism in Elliptic Spaces.” Fubini gained some early fame when his thesis was discussed in Bianchi’s widely read 1902 work on differential geometry.

In 1901 Fubini began teaching at the University of Catania in Sicily and shortly thereafter he moved to the University of Genoa. In 1908, he moved to the Politecnico in Turin and then the University of Turin where he remained for several decades. Fubini’s interests and researches were wide ranging, including differential geometry, analysis, applications of differential equations, group theory, non-Euclidean geometry, projective geometry, and calculus of variations. He was said to be one of the most original minds in mathematics during the first half of the 20th century. During WWI he applied his work to assist the Italian army in the areas of artillery, acoustic propagation, and electric circuits.

Fubini, who was Jewish, was forced to resign from his chair at Turin in 1938 when Mussolini adopted

his own Manifesto of Fascist Racism, even though he had earlier declared Hitler's National Socialism as "one hundred percent racism." In 1939, Fubini received an invitation from the Institute for Advanced Study in Princeton. Fearing for the safety of his family, Fubini emigrated from Italy to the United States, where he taught for a few years at Princeton before his death in 1943.

During his lifetime Fubini wrote several textbooks on analysis as well as collections of problems. Because his sons trained as engineers, Fubini was interested in applying mathematics to problems in that field. One of his sons, Eugene, helped set up operations for locating and jamming Axis radar to reduce its effectiveness in pinpointing Allied aircraft during the invasions of Italy and southern France. In 1963, President Kennedy selected Eugene Fubini for the position of assistant secretary of defense.

In an interview with Albert Tucker on June 7, 1984, Ernst Snapper recalled Fubini's stay at Princeton and his explanation of the "Fubini gun." With it the interior ballistic can be set in such a way that a projectile in a cylinder comes out of the gun in a curve that has a double point and comes back and hits behind the gun. So the gun should be aimed at one's own troops because when fired the bullet will come back and kill the enemy. Fubini said that he had been invited to the Pentagon to describe his idea, but when the officials heard his explanation they walked out of the room. In the same interview Snapper related another Fubini story. His students received a phone call from Fubini's landlady because the professor had not arrived home at his usual hour. The students looked everywhere for him and became quite worried. Finally one of them suggested that they should check the elevator in Fuld Hall. If it had got stuck, Fubini, who was almost a midget, would not be able to reach the call button. Sure enough, the elevator had got stuck and Fubini was trapped inside. The students were able to get Fubini out. He claimed they had saved his life and gave them a party. He gave instructions to his landlady that if he ever was not home by 6:30 someone was to check the elevator in Fuld Hall.

Quotation of the Day: “In our universe, matter is arranged in a hierarchy of structures by successive integrations.” – François Jacob