

FROM A MEASURE THEORY TO A THEORY OF MEASURES

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The idea of this talk is to describe how Carathéodory developed what can be rightfully named a theory of measures from the ideas set out initially in the late 19th and early 20th Centuries by Jordan, Borel and Lebesgue (among others) even though this was not the envisaged goal of these authors.

The three French authors we have mentioned all developed a measure as an auxiliary tool in their research, it is quite clear that none of them intended to study the measure they had created on its own; their goal was to facilitate and improve either integration theory or complex variable theory. However, it was the manner in which Borel and Lebesgue presented their measures that would eventually lead to Carathéodory's approach and it is our claim that it is at this moment that an object called a "measure" was introduced as such in mathematics. In other words, it was the axiomatic approach followed by Lebesgue (and Borel) that allowed Carathéodory's "formal theory of measurability" and eventually led to measure theory (as a theory whose objects are measures) as known today.

THE RIESZ BROTHERS'S CORRESPONDENCE

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The Riesz brothers, Frigyes Riesz (1880-1956) and Marcel Riesz (1886-1969) were world famous mathematicians in the 20th century. Frigyes Riesz was one of the founders of functional analysis; the famous Riesz-Fischer theorem is familiar to every mathematician. Marcel Riesz's main research topic was also mathematical analysis, and he founded a Swedish mathematical school devoted to the theory of partial differential equations. They were not only excellent scholars, but also founders of mathematical schools. Frigyes Riesz taught at universities in Hungary (Kolozsvar, Szeged and Budapest), and Marcel Riesz at universities in Sweden (Stockholm and Lund).

In 2002, the granddaughter of Marcel Riesz gave the academic legacy of Marcel Riesz to the Department of Mathematics at the University of Lund. László Filep (1941-2004), a Hungarian historian of mathematics, put this legacy in order in 2003. During his time in Sweden, Filep examined the letters of Hungarian mathematicians, and realized that probably the most interesting correspondence in the legacy was that between the two Riesz brothers. He planned to publish the Riesz brothers's correspondence in a book, but unfortunately Filep died a year later. In our project we carry on with his work at the Institute for History of Hungarian Sciences.

Marcel Riesz's academic legacy is quite interesting. He kept in contact with many mathematicians. In our work we focused mainly on the Hungarian correspondence, but we should mention that Prof. Jaak Peetre is currently working on the Swedish correspondence side. Frigyes Riesz's academic legacy is in Budapest. In his legacy we can find letters by Marcel Riesz. We would like to publish a book about the most important letters from a historical and mathematical point of view in the near future.

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THE BAIRE CLASS AND THE THEORY OF FUNCTIONS

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The objective of the conference is to show that the discontinuous functions begin to surface like a significant field with the theoretical developments of René Baire, established in his thesis doctoral of 1899. In this document Baire defines a hierarchy of functions designated the "Baire class". From Baire, we know that the continuous functions conform only a first level of the universe of functions, since while the set of the continuous functions has the potencia of the continuous, the set of all the functions has a potencia greater. Through the exposition will show the way in that Baire uses the punctual convergence of sucesiones of functions in the perspective of the theory of set of Cantor and in the line of developments of Weierstrass, Darboux and Borel. The origin of the developments of Baire have relation with his interpretation of the famous false teorema of Cauchy, as which "sum arbitrary of continuous functions is continuous". For this Baire analysed the characteristics of the discontinuous functions, obtained of convergent series of continuous functions.