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INSTITUTO NACIONAL DE MATEMÁTICA PURA E APLICADA

Introduction to
Diophantine approximation and transcendental number theory

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Université Pierre et Marie Curie - Paris VI

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The purpose of this course is to give an elementary introduction to some of the main results in Diophantine approximation and transcendence. The emphasis will be on the ideas, technical details will be reduced to the minimum. The course will start with rational approximation to real numbers. The main tool is the theory of continued fractions. As an application of this theory, we will study the so-called Pell-Fermat equation. We explain the relation with the units of quadratic number fields. Rational approximation theory yields irrationality results. We give an overview of the main results of irrationality and their proofs. Liouville introduced what is called now in dynamical systems a Diophantine condition. We study the proof of Liouville and the properties of the set of Liouville numbers. After irrationality, the next step is transcendence. This course will include a survey of the main ideas which are used in the proofs of transcendence and algebraic independence, including the proof by Nesterenko in 1996 of the algebraic independence of values of modular functions.

Remark

Few prerequisites are necessary to follow this course. Depending on the audience, the necessary background will be recalled whenever it is necessary. This course will provide the interested students necessary bases if they wish to pursue on this topic and continue their studies for a thesis, for instance in Paris VI.

for further information:

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