Frontiers of Mathematics Lecture

What we know about transcendental numbers and what we would like to know
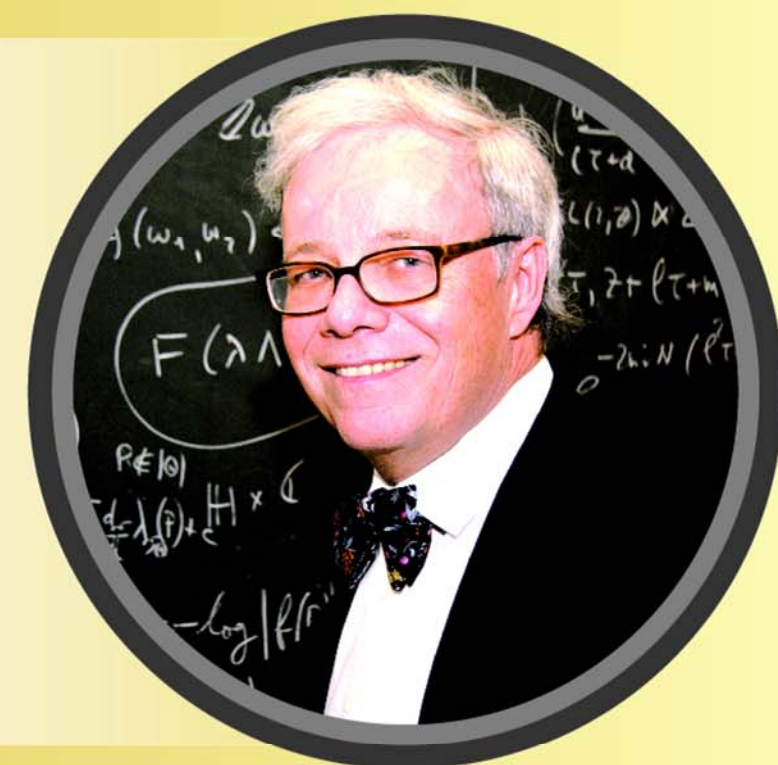
Professor Gisbert Wüstholz

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Date : May 17, 2019 (Friday)
Time : 5:30 – 6:30 pm
(Tea Reception starts at 5:00 pm)
Venue : Lecture Theatre A, G/F, Chow Yei Ching Building
The University of Hong Kong

Abstract

Numbers are a reality which we face every day, transcendental numbers which are a part of them almost never. That they exist was unknown until Liouville constructed in 1844 in a relatively elementary way numbers which he proved to be transcendental and he showed that the set of these numbers has the cardinality of the continuum. This initiated the search for transcendental numbers which turned out to be like the search for a needle in a haystack. In our lecture we discuss transcendence and possible linear or algebraic relations between now known transcendental numbers. A very successful way to produce them is to look at periods of rational integrals and now there is some systematics and a lot of results about this. But there are also a lot of conjectures which are seemingly out of reach at present. One exciting such question is to decide which complex numbers are periods and which are not. Recently some attempts were made to bring light into the dark.

Biography

Gisbert Wüstholz is professor emeritus at the Federal Institute of Technology (ETH) at Zurich since 2013. He received his PhD at the University of Freiburg, his Habilitation at the University of Wuppertal and the University of Bonn. His research interests cover number theory and algebraic geometry, in particular the theory of transcendental numbers. He has been professor at Wuppertal before he changed to ETH.

Highlights of his scientific work are the multiplicity estimates on group varieties, the analytic subgroup theorem and, together with D. Masser, isogeny estimates for abelian varieties, all published in the Annals. Further highlights are joint work with Faltings on Schmidt's subspace theorem and joint work with Baker on logarithmic forms including a monograph that appeared in the New Mathematical Monographs, Cambridge University Press.

Since 2011 he serves as senator at the National German Academy of Science - Leopoldina, since 2003 he is elected member of the berlin-brandenburgische Akademie der Wissenschaften, in 2011 he was elected as a member of the Academia Europaea and in 2016 as a member of the European Academy of Sciences and Arts. He has been frequent long term visitor at HKUST and HKU.