Submittee: Franz-Viktor Kuhlmann
Date Submitted: 2012-03-05 11:09
Title: Eleventh Colloquiumfest
Event Type: Conference-Workshop

Location:
University of Saskatchewan Department of Mathematics and Statistics 106 Wiggins Road, Saskatoon, S7N 5E6, Canada

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Dates:
February 3 and 4, 2012

Topic:
valuation theory, number theory and algebraic geometry

Methodology:
Lectures. Two of them (on the first day) in the framework of the department colloquium.

Objectives Achieved:
One main objective of the Colloquiumfest series is to bring young mathematicians in contact with well-established senior researchers and to give them an occasion to report on their research in a relaxed and informal setting. In the 11th Colloquiumfest, this opportunity was given to the graduate students and postdoctoral fellows that are in Saskatoon during the Emphasis Year on Valuation Theory 2011/12. The talks presented a nice survey of the research done by the algebra group in Saskatoon and its visitors, which was not only of interest for the members of the group itself, but also for our visitors from abroad, Julia Gordon and Clifton Cunningham. Their visit also served the purpose of starting a discussion about a possible new PIMS collaborative research group. We assembled a list of researchers that we intend to ask to join us in this project, and we agreed on details of how we want to proceed. The next step will be a visit of F.-V. Kuhlmann at the UBC at the end of March.

Scientific Highlights:
Julia Gordon, Clifton Cunningham and F.-V. Kuhlmann started preparations for a possible PIMS collaborative research group.

Organizers:
Kuhlmann, Franz-Viktor University of Saskatchewan Department of Mathematics and Statistics

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Speakers:

Speaker 1: Julia Gordon (Mathematics Department, University of British Columbia, Vancouver, Canada) Title: Constructible motivic functions, transfer principles, and applications Abstract: Constructible motivic functions are functions on discretely valued fields that are, in a sense, built from definable functions in the so-called Denef-Pas language (a first-order language designed for working with valued fields). The remarkable property of this class functions is that it is closed under integration (where "integration" is understood as motivic integration, as developed by R. Cluckers and F. Loeser). I will talk about motivic integration and the transfer principles for constructible motivic functions, which allow us to transfer statements between local fields of characteristic zero and those of large positive characteristic. I also hope to discuss some applications of this method in the Langlands program. Speaker 2: Clifton Cunningham (Department of Mathematics and Statistics, University of Calgary, Calgary, Canada) Title: The elementary particles of number theory Abstract: The Langlands program has the same historical point of departure as quantum field theory: use group representation theory to classify observed, fundamental objects. In the Langlands program, the `observed, fundamental objects' are L-functions, especially Artin L-functions, and the group representations are automorphic representations, generalizing modular forms. In this talk I will give a ridiculously simplistic overview of the Langlands program, explain how it is aimed at some deceptively simple problems in number theory, and report on recent progress. Speaker 3: Samar ElHitti (Mathematics Department, New York City College of Technology CUNY, USA, currently postdoc at University of Saskatchewan) Title: The Dependent Artin-Schreier defect extension that fails Strong Monomialization. Abstract: Artin-Schreier defect extensions are of interest in working on Local Uniformization in positive characteristic, in particular, Kuhlmann classifies such extensions as dependent and independent, and we are interested in the role this classification plays. Recently, we proved using generating sequences of valuations that the first extension of the example constructed by Cutkosky and Piltant that fails strong monomialization (a relative form of Local Uniformization) is indeed a dependent Artin-Schreie r extension, as conjectured by Kuhlmann. We give motivation and background for studying such problems. Speaker 4: Mohammad Moghaddam (IPM, Teheran, Iran, currently postdoc at University of Saskatchewan) Title: The topological, metric and parametric structures on the space of valuations centered on a ring Abstract: In algebraic geometry, the topological study of the space of valuations, Riemann-Zariski manifold, began by the work of Zariski on local uniformization problem. We show that the structure of this space can be studied be the use of two different representations of the valuations, i.e., the key-polynomial and the generalized power series representation of the valuations. These different descriptions allows us to study the contact structure of the valuations on the Riemann-Zariski manifold and to interpret the contact in terms of the truncations of generalized power series. Moreover, it allows us to give a natural parametrization of the Riemann-Zariski manifold. Speaker 5: Katarzyna Kuhlmann (Mathematical Institute, Silesian University, Katowice, Poland) Title: The structure of spaces of real places of rational function fields over non-archimedean ordered fields Abstract: In recent years, spaces of places and their structure have become a center of interest in valuation theory and algebraic geometry. We study those spaces of places that are associated with ordered fields: the so-called R-places (where R denotes the field of real numbers). This is a quotient space of the space of orderings. Already in the seemingly "simple" case of a rational function field in one variable over non-archimedean ordered fields, we observe a stunningly rich structure, including an abundance of self-similarities. In this talk, we will give a survey of the known structure and open problems. Speaker 6: Izabela Vlahu (Department of Mathematics and Statistics, University of Saskatchewan, Canada) Title: On henselizations of rational function fields Abstract: We consider a valued field (K, v) and an element x which is the limit of a pseudo Cauchy sequence in K of transcendental type. Now, given a polynomial f in K[x], we know the degree [K(x):K(f(x))] = deg(f), but things change drastically when we go to the henselizations of K(x) and K(f(x)). In the first part of the talk we will give an upper bound for the degree [K(x)^h :K(f(x))^h]. Then we refine things by taking an element y in the henselization of K(x), y transcendental over K, and we ask for the degree [K(x)^h : K(y)^h]. Speaker 7: Josnei Antonio Novacoski (Department of Mathematics and Statistics, University of Saskatchewan, Canada) Title: Reduction of local uniformization to the rank one case Abstract: The

main result presented in this talk is that in order to prove the local uniformization theorem for local rings it is enough to prove it for rank one valuations. Our proof does not depend on the nature of the class of local rings for which we want to prove local uniformization. We prove also the reductions for different versions of the local uniformization theorem. Speaker 8: Asim Naseem (Abus Salam School of Mathematical Sciences, Lahore, Pakistan, currently postdoc at University of Saskatchewan) Title: The completion defect and defects of valued function fields Abstract: The investigation of "defect" is of great interest in working on deep open problems of valuation theory in positive characteristic. For a deeper analysis, we define and investigate two weaker notions of defect. Namely, we define "completion defect" and "defect quotient" for finite extensions as well as for valued function fields. In this talk, we will present interesting results on both these defects. We use them to give a characterization of separably defectless fields.

Links:
http://math.usask.ca/fvk/CF11.htm

Comments / Miscellaneous:
While the core group that met on both days had 11 members, the talks on Friday were set in the framework of the department colloquium and attracted more attendees from the Department of Mathematics and Statistics and other departments on campus.

File Uploads:
Additional Upload 1: http://www.pims.math.ca/files/final_report/CF11BREP.pdf

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