Uno Kaljulaid (1941–1999)

Kaljulaid's CV

- Born on 21.10.1941 in Kõpu, near to Viljandi
- graduated the Pärnu First High School in 1959
- Studies at Tartu University 1959–1963
- Studies at Moscow University 1963–1967 (incl. post graduate studies)
- Soviet Red Army 1967–1968
- Post graduate studies at UT 1968–1972
- Assistant Professor at UT 1972–1974
- Associate Professor at UT, institute of algebra and geometry 1972–1983
- Defense of the Candidate degree on March 11, 1979, at the Mathematical Institute of the Byelorussian Academy of Sciences
- Docent at UT, institute of computer science 1983–1999
- Senior research scientist at Institute of Cybernetics 1993–1999

Uno Kaljualid – a student in Tartu

Yuri Ivanovitch Manin

Boris Isakovich Plotkin, supervisor

Military service 1967

V. Vagner, J. Hion, E. Lyapin, L. Shevrin, L. Gluskin and B. Plotkin
(Kääriku 1966)

Mati Kilp and Uno Kaljulaid on their way to Moscow 1964

Kaljulaid's research (1)

- **Representations of semigroups and algebras**
  - On the cohomological dimension of some quasiprojective varieties. [K69a]
  - Triangular products of representations of semigroups and associative algebras [K77a]
  - Triangular products and stability of representations. Candidate dissertation [K79a]
  - Some remarks on Shevrin's problem [K87a]
  - Transferable elements in group rings [K90]
  - Ω-rings and their flat representations. *Coauthor O. Sokratova* [K00]

Kaljulaid's research (2)

- **Automata theory**
  - Automata and their decomposition [K94]
  - On two algebraic constructions for automata. Coauthor J. Penjam [K97]
  - Revisiting wreath products, with applications to representations and invariants [K98c]
- **Combinatorics**
  - On Stirling and Lah numbers [K88a]
  - On Fibonacci numbers of graphs [K91]
- **History ofMathematics**
  - On the results of Molien about invariants of finite groups and their renaissance in contemporary mathematics [K87e]
  - Notes on five 19th century Tartu mathematicians (Backlund, Kneser, Lindstedt,
  - Molien, Weihrauch)

Popular science papers

- On the geometric methods of Diophantine Analysis [K68a] and [K69b]
- Lenin prize for work in Diophantine geometry [K68b]
- The history of solving equations [K69c]
- Additional remarks on groups [K70]
- Polynomials and formal series [K73a]
- On Galois theory [K75a]
- Theory of automata. Coauthor E. Tamme [K75b]
- Mordell's problem [K93c]
- On two discrete models in connection with structures of mathematics and language [K96]

Kaljuaid's reserach plans

Automata theory (1)

Part A: **Automata, Languages and Rationality**

Chapter I. Automata and their decomposition

1. Definition of automata
2. Preliminary motivation and more notions
3. Semigroup automata
4. Cyclic automata
5. Wreath products of actions
6. Kaluzhnin-Krasner type theorem
7. Cascades and wreath products of automata; their interconnections
8. Linear automata
9. Triangular products and decomposition of linear automata
10. Decomposition of linear automata and image compression]

Kaljuaid's reserach plans

Automata theory (2)

Chapter II. Rationality

1. Recalling well-known things: formal series
2. Rational series
3. Recognizable series
4. Rational (regular) languages

Chapter III. Generalized automata

1. Preliminary motivation and a very brief introduction to categories
2. Cascades once more – their intersections with wreath products
3. Wreath products of general automata – covariant case
4. Wreath products of presheaves – contravariant case
5. Properties of the wreath product construction and the key result
6. Groupoids, symmetries and the Van Kampen Theorem
7. Wreath products of of species and their many combinatorics

Kaljuaid's reserach plans

Automata theory (3)

Part B: **Automata, Languages and Rationality**

Chapter IV. Remarkable functions (zeta!)

1. General remarks, motivation
2. Some more definitions, concerning languages and automata
3. The Berstel-Reutenauer Theorem
4. Other remarks on rationality
5. Rationality – on the notion itself
6. Wreth products of actions
7. Gert Almkvist's results on periodic Boolean sequences revisited
8. Supplement. Radar codes

Chapter V. Rationality

1. How the idea of continuity first appears in Language Theory
2. How to generalize this context
3. The leading example – Björner topology
4. The key object of study – the algorithm C 5.5. New interpretation of C. Further possibilities
5. Grothendieck topologies and formal languages
6. Grothendieck topologies and RO-groups and R-groups

Uno Kaljulaid (1941 - 1999)

This Volume provides a selection of previously published papers and manuscripts of Uno Kaljulaid, an eminent Estonian algebraist of the last century.

Kaljulaid's main fields of research concerned representation theory, automata and combinatorics. Most of his papers, originally in Russian, a few also in Estonian, are now presented in English. As well as being an outstanding scientist, Uno Kaljulaid was also a most dedicated teacher with numerous students, and with an unusually broad, almost universal, mathematical background. He took a vivid interest in the history of science, and did a lot for the popularization of mathematics and its applications. The book purports to cover the entire spectrum of his many activities, and so it will be of interest to readers with a quite varied background in mathematics.

Uno Kaljulaid was born in the small village of Kõpu in south-western Estonia. He received his secondary education in Pärnu, on the Gulf of Riga, graduating from the City's First High School in 1959, and then studied mathematics at Tartu University. One year was spent at Moscow University where he obtained his Diploma under the influence of Yuri Manin. He defended his Candidate Thesis in Minsk under Boris Plotkin (Riga, now Jerusalem) in 1979. Uno Kaljulaid taught at Tartu from 1972; moreover, from 1993 on, he did scientific work and provided consultations at the University's Computer Science Institute, and was also a Research Fellow at the Tallinn Institute of Cybernetics.

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Semigroups and Automata. SELECTA Uno Kaljulaid (1941 - 1999)

Semigroups and Automata

$$x \triangle (f \cdot g) = f^A(x) \triangle g$$

SELECTA

Uno Kaljulaid (1941 - 1999)

Edited by Jaak Peetre and Jaan Penjam

IOS Press

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Killustik (http://www.math.ut.ee/varia/killustik)

- Aga hakates kombineerima funktsioonide graafikutega te märkate, et tekivad suured raskused; ausalt öeldes tekivad vastuolud.
- "Palju seda aega on? Ah, aega veel on, võibolla jõuame isegi lõppu." (94s)
- "Kui nüüd Birkhoffi teoreemi ekspluateerida..." (94s)
- Kaljulaid annab algebra praktikumis lahendada raske ülesande. Natukese aja pärast ütleb Kaljulaid:
  "Vanasõna ütleb: tee tööd ja näe vaeva, siis tuleb ka idee."
  Mõne aja pärast hakkab Kaljulaid auditooriumis vaatama, kuidas lahendamine edeneb. Jõudnud järjega Egoni pingi juurde, näeb ta tema vihikus lahenduse asemel ilusa käekirjaga maalitult: "Tee tööd ja näe vaeva, siis tuleb ka idee!" Selle peale märgib Kaljulaid:
  "Aktiivsust on märgata, aga vales suunas." (90k)
- "Kui te pöörate võrratusemärgid vastupidiseks, siis tekib midagi õiget." (94s)
- "Igrek tuleb tsetiks võtta. Aga mida võtta igrekiks?" (94s)
- "Kunagi tuli minu juurde üks mees, kes väitis, et ta on tõestanud Fermat' teoreemi. Aga ta oli tark mees, sai kohe oma veast aru." (1993 sügis)
- "...kus x on piisavalt viisakalt käituv suurus." (JV)
- "Valem (0) annab valemit (-1) kasutades valemi (0')." (JV)
- "Hamming on üks ameerika matemaatik. Praegu üldiselt ... elus." (JV)
- "Kuulge, me oleme selle filoloogiaga peaaegu lõppu jõudnud!" (92 sügis)
- "Kõik on siin seotud, see on ilus pundar!" (92 sügis)
- "Rühmateooria on nii teadus kui ka kunst kui ka sport kui muu." (93 kevad)
- "Üllataval kombel matemaatika on täiesti ühtne." (93 kevad)
- "Kui te ronite mäe tippu ja te ei tea, kus see mäetipp on või kas teda üldse on, siis see on päris huvitav ettevõtmine." (93 kevad)