Kobe-Lyon Summer School in Mathematics 2015

On Quivers : Computational Aspects and Geometric Applications

July 21 - 31, 2015

B301, Graduate School of Science, Kobe University

PROGRAM

1st week (21–24, July)

July 21, (Tuesday)

10:00–11:30 : **Nobuki Takayama (Kobe)**
Introduction to Gröbner basis:
Lecture 1. *Basics on ideals and Gröbner basis: Dickson's lemma, division or reduction, Buchberger's criterion, confluence*

13:30–15:00 : **Rouchdi Bahloul (Lyon)**
Gröbner bases in D-modules and application to Bernstein-Sato ideals
Lecture 1. *Introduction to Gröbner and (local) standard bases in the ring of differential operators with polynomial coefficients.*

15:30–17:00 : **Philippe Malbos (Lyon)**
Non-commutative Gröbner basis : applications and generalizations
Lecture 1. *Introduction to rewriting and linear rewriting*

July 22, (Wednesday)

10:30–12:00 : **Nobuki Takayama (Kobe)**
Introduction to Gröbner basis:
Lecture 2. *Integration of D-modules and an algorithm for it.*

13:30–15:00 : **Rouchdi Bahloul (Lyon)**
Gröbner bases in D-modules and application to Bernstein-Sato ideals
Lecture 2. *Introduction to local and global Bernstein-Sato ideals* for several polynomials.

15:30–17:00 : **Philippe Malbos (Lyon)**
Non-commutative Gröbner basis : applications and generalizations
Lecture 2. *Generators, relations and syzygies.*

July 23, (Thuesday)

10:00–11:30 : **Satoshi Aoki (Kobe)**
Markov basis and Gröbner basis in statistics

13:30–15:00 : **Philippe Malbos (Lyon)**
Non-commutative Gröbner basis : applications and generalizations
Lecture 3. *Construction of resolutions of algebras and path algebras*

15:30–16:15 : **Nohra Hage (Lyon)**
Study of plactic monoids by rewriting methods.

16:15–17:00 : **Cyrille Chenavier (Lyon)**
Confluence algebras and acyclicity of the Koszul complex

July 24, (Friday)

10:00–11:30 : **Rouchdi Bahloul (Lyon)**
Gröbner bases in D -modules and application to Bernstein-Sato ideals
Lecture 3. *Algorithm for computing local and global Bernstein-Sato ideals* and stratification results.

13:30–15:00 : **Philippe Malbos (Lyon)**
Non-commutative Gröbner basis : applications and generalizations
Lecture 4. *Higher-dimensional linear rewriting*

15:30–16:15 : **Clément Alleaume (Lyon)**
Study of monoidal linear categories by rewriting methods

2nd week (27–31, July)

July 27, (Monday)

10:00–11:30 : **Kenji Iohara (Lyon)**
Lecture 1. *Introduction to representations of quivers.*
13:30–15:00 : **Kenji Iohara (Lyon)**
Lecture 2. *Introduction to representations of quivers.*
15:30–17:00 : **Antoine Caradot (Lyon)**
Deformations and resolutions of Kleinian singularities

July 28, (Tuesday)

10:00–11:30 : **Yoshiyuki Kimura (Kobe)**
Lecture 1. *Introduction to quiver varieties*
13:30–15:00 : **Yoshiyuki Kimura (Kobe)**
Lecture 2. *Introduction to quiver varieties*
15:30–17:00 : **Yuya Takayama (RIMS, Kyoto)**
Quivers and moduli spaces of instantons and sheaves.

July 29, (Wednesday)

10:00–11:30 : **Masa-Hiko Saito (Kobe)**
Application of quiver varieties to the control theory
13:30–14:15 : **Nobuhiko Tahara (Kobe)**
Explicit families of certain linear connections on $\mathbb{P}^1 \setminus \{0, 1, \infty\}$
14:15–15:00 : **Kazunori Miyazaki (Kobe)**
On some examples of moduli spaces of meromorphic connections on $\mathbb{P}^1$.

July 30, (Thuesday)

10:00–11:30: **Daisuke Yamakawa (Tokyo Institute of Technology)**
Lecture 1. *Applications of quiver varieties to moduli spaces of connections on* $\mathbb{P}^1$*, I*
13:30–15:00 : **Daisuke Yamakawa (Tokyo Institute of Technology)**
Lecture 2. *Applications of quiver varieties to moduli spaces of connections on* $\mathbb{P}^1$*, I*
15:30–17:00 : **Arata Komyo (Kobe)**
Geometric description of the moduli space of parabolic connections on $\mathbb{P}^1 \setminus \{t_1, \ldots, t_5\}$ *and the universal family.*

July 31, (Friday)

10:00–11:30 : **Kazuki Hiroe (Josai)**
Lecture 1. *Applications of quiver varieties to moduli space of connections on* $\mathbb{P}^1$*, II*
13:30–15:00 : **Kazuki Hiroe (Josai)**
Lecture 2. *Applications of quiver varieties to moduli space of connections on* $\mathbb{P}^1$*, II*

Organizers
Kenji IOHARA (Lyon1), Philippe MALBOS (Lyon1),
Masa-Hiko SAITO (Kobe), Nobuki TAKAYAMA (kobe)

Supported by
Université Claude Bernard Lyon1
Kobe University
Institut Camille Jordan, UMR 5208, Lyon
Graduate School of Science, Kobe University
JSPS Grant-in-aid (S) 24224001 (PI: Masa-Hiko SAITO)
JSPS Grant-in-aid (B) 25287018 (PI: Nobuki TAKAYAMA)
Labex MILYON, Mathématiques et Informatique Fondamentale de Lyon

URL
http://www2.kobe-u.ac.jp/ mhsaito/kobelyon2015/index.html