UNIVERSITÉ DU LUXEMBOURG

UR-MATH
Mathematics
Research Unit

UR-CSC
Computer Science
and Communications
Research Unit

In the framework of the activities of the UR-MATH and UR-CSC units in Discrete Mathematics, we are pleased to announce a colloquium on

COMBINATORIAL GAMES

to take place on *Monday May 10, 2010* at the following address

University of Luxembourg

Campus Kirchberg

CSC Unit

Room E 112

6, rue Coudenhove-Kalergi
L-1359 Luxembourg-Kirchberg

In order to facilitate the organization of the meeting, attendees are asked to register in advance (by April 30) either by mail, fax, or email to Jean-Luc Marichal

I will attend the Combinatorial Game Colloquium

Name: ………………………………………………………………………………..

Institution: ……………………………………………………………………….

For additional information, feel free to contact

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University of Luxembourg
Mathematics Research Unit, FSTC
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L-1359 Luxembourg-Kirchberg

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PROGRAMME

Mathematics Research Unit
Computer Science and Communications Research Unit
University of Luxembourg – FSTC

May 10, 2010

Combinatorial games

12.15 : Lunch

13.00 : Narad Rampersad (University of Liège, Belgium)
Non-repetitive sequence games

14.00 : Michel Rigo (University of Liège, Belgium)
Combinatorial games and numeration systems

15.00 : Coffee break

15.20 : Tamás Waldhauser (University of Luxembourg)
Play with LEGO!

16.20 : End of the meeting

Attendance of the meeting is free of charge

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Fax: +352 46 66 44 6944
Email : Jean-Luc.Marichal@uni.lu

ABSTRACTS

1. Narad Rampersad (University of Liège, Belgium)

   Non-repetitive sequence games

   One of the fundamental problems in combinatorics on words is to construct non-repetitive sequences: that is, sequences over a finite set of symbols with the property that the sequence never contains two identical, adjacent blocks of terms. Thue showed in 1906 that such a sequence can be constructed using only 3 symbols. One can consider the construction of such sequences in terms of the following game. There are two players: Maker and Breaker. The players construct a sequence symbol by symbol as follows. On his turn, a player appends a new symbol to the existing sequence, but must preserve the property that the sequence be non-repetitive. Maker's goal is to try to play forever; Breaker's goal is to force Maker into a configuration where he cannot avoid creating a repetition. We consider the question "When does Maker have a winning strategy in the sequence game?" For instance, Pegden has shown that if the game is played with a sufficiently large set of symbols, then Maker has a winning strategy.

2. Michel Rigo (University of Liège, Belgium)

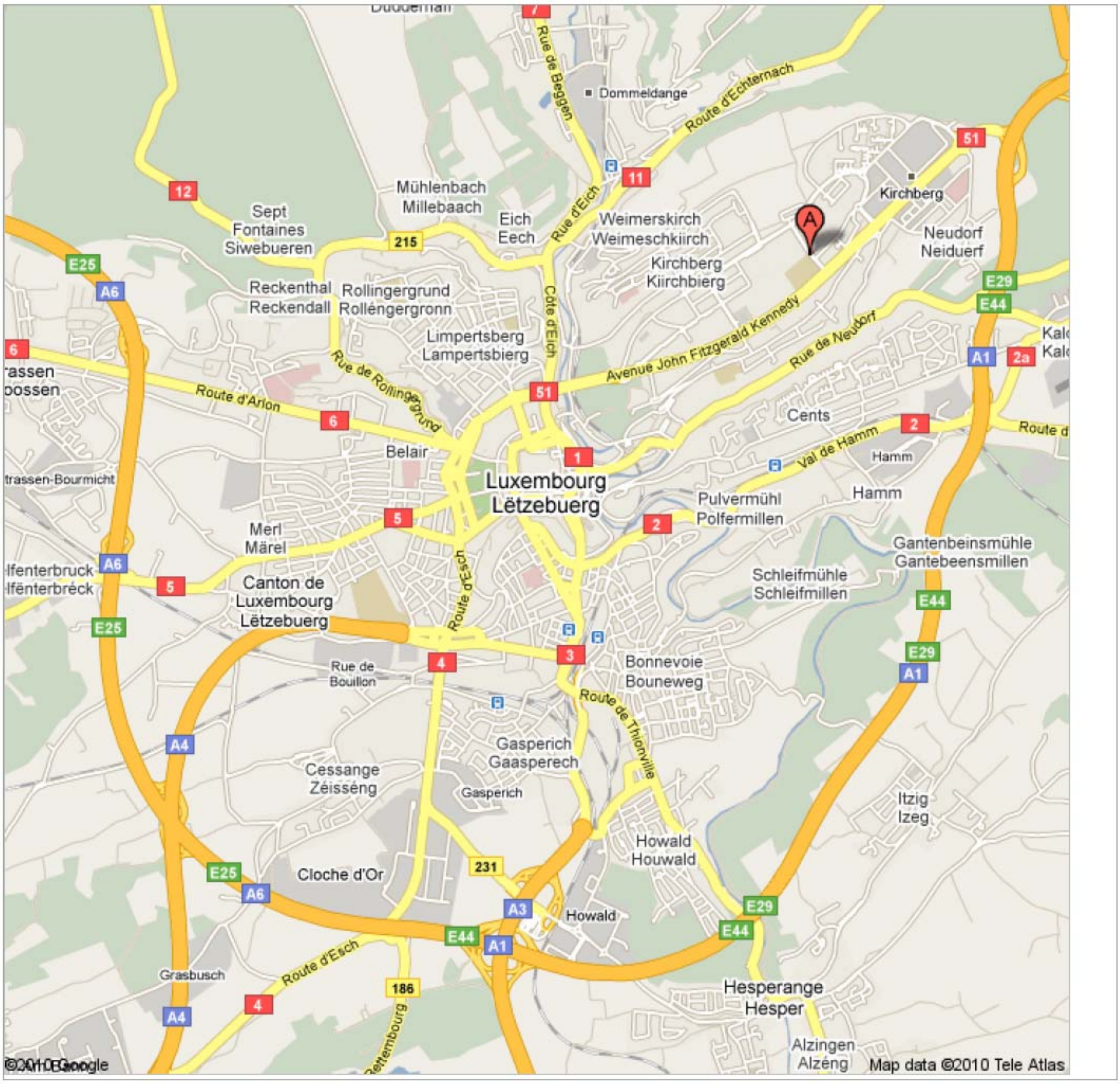
   Combinatorial games and numeration systems

   In the last few years, I became interested in combinatorial game theory. In famous games like Wythoff's game or Nim game, numeration systems like integer base systems or Fibonacci (also called Zeckendorf) numeration systems play a particular role. Following Fraenkel's work, defining the right numeration system turns out to be helpful to get a polynomial characterization of the P-positions of the game (or sometimes, also leads to a polynomial winning strategy). In this informal talk, I will present some of the links existing between these the two topics. For instance, Ostrowski numeration system (based on the convergents of a continued fraction) or linear numeration systems based on a linear recurrent sequence are of particular interest.

3. Tamás Waldhauser (University of Luxembourg, Luxembourg)

   Play with LEGO!

   The winning strategy of certain games can be found with the help of the Sprague-Grundy function. When playing a sum of two games, the SG function can be easily determined from the SG functions of the two summands using nim addition. Another way to compose two games is forming their product; here a function discovered by László Kalmár and Hugo Steinhaus can be used instead of the Sprague-Grundy function, and nim addition is replaced by the minimum operation. We propose a third way to compose two games that is a mixture of sum and product. We show that the Kalmár-Steinhaus function can be used in this stituation as well: the KS function of the composition can be computed from the KS functions of the two components with the help of an appropriate associative binary operation on the nonnegative integers.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