数論セミナー

日時：2023 年 3 月 27 日（月）15：30〜
場所: Hybrid

講演者：高溝史周 (F. Takamizo)
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講演題目：Finite beta-expansions of natural numbers

Let $\beta > 1$. For $x \in [0, \infty)$, we have so-called the *beta-expansion* of x in base β as follows:

$$x = \sum_{j \leq k} x_j \beta^j = x_k \beta^k + \cdots + x_1 \beta + x_0 + x_{-1} \beta^{-1} + x_{-2} \beta^{-2} + \cdots$$

where $k \in \mathbb{Z}$, $\beta^k \leq x < \beta^{k+1}$, $x_j \in \mathbb{Z} \cap [0, \beta)$ for all $j \leq k$ and $\sum_{j \leq n} x_j \beta^j < \beta^{n+1}$ for all $n \leq k$. In this talk, we give a sufficient condition (for β) such that each element of $\mathbb{N}$ has the finite beta-expansion in base β. Moreover we also find β with this finiteness property which does not have positive finiteness property.

講演者：吉田雅通・高溝史周 (M. Yoshida & F. Takamizo)
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講演題目：
Signed expansion of integers based on a Cubic Pisot unit
３次 Pisot 単数に基づく整数の符号つき展開

Let β be a cubic Pisot unit. In this talk, first a signed Markovian expansion of each integer in base β is introduced; let Z be the set consisting of signed expansions of integers. We then discuss the odometer $H : Z \to Z$ associated with this expansion, and its uniform continuity. When $H : Z \to Z$ is uniformly continuous, there is unique homeomorphic extension $H : M \to M$ to the closure M of Z. Here M is a shift of finite type (in other words, a Markovian space). Moreover we can show there is a two-dimensional geometric realization of the dynamical system (M, H) which is a Rauzy-fractal-like object with a domain exchange, thanks to the Markovian property. Finally let me show you some pictures of these realizations.

　まず３次 Pisot 単数 β に基づく整数のマルコフ型の符号つき展開を紹介する。それぞれの整数の符号つき展開の全体を Z とし、付随する加算器 $H : Z \to Z$ の一様連続性について議論する。$H : Z \to Z$ が一様連続のとき、Z の閉包 M 上へ H の同相な拡張が定まるが、展開 (いいかえて空間 M) のマルコフ性に基づき、力学系 (M, H) の幾何的な２次元表現を得ることが出来た：この表現は いわゆる Rauzy フラクタルとよぶべき対象になる。最後に２つの具体的な絵をお見せして説明してみたい。

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