



2018 RIMS 共同研究「画像解析と多次元ウェーブレット解析」  
(Image analysis and multidimensional wavelet analysis)

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日時：2018年10月22日（月）～2018年10月23日（火）

会場：京都大学数理解析研究所 111 号室  
〒606-8502 京都市左京区北白川追分町

プログラム

10月22日（月）

13:00 – 14:00 **M. W. Wong** (York University, Toronto, Canada)

**Phases and instantaneous frequencies of modified Stockwell transforms**

Modified Stockwell transforms are introduced to include the classical Stockwell transforms and related wavelet transforms. The subtle difference between the Stockwell transforms and the Morlet wavelet transforms is highlighted. The focus of the talk is on the phases of modified Stockwell transforms in general and explicit formulas on instantaneous frequencies of signals using the modified Stockwell transforms in particular.

14:15 – 15:15 井川 信子（流通経済大学） Nobuko Ikawa

**Wavelet analysis of the auditory evoked potentials which recorded human vertex responses**

This speech describes about the wavelet analysis of auditory evoked potentials, such as auditory brainstem responses (ABRs) and auditory steady-state responses (ASSRs). Because the ABR is an examination in the hearing diagnosis of using the peak amplitudes and latencies, one-dimensional discrete stationary wavelet analysis is benefit to ABR. Power spectrum analysis and phase coherence using one-dimensional complex continuous wavelet analysis are useful for the detection of ASSR, because of its sinusoidal waveform configuration.

15:45 – 16:45 秋山 浩一郎（東芝） Koichiro Akiyama

**Post-Quantum Public-key Cryptosystems and their problems**

In 1994, Shor proposed quantum algorithms that can solve the factorization problem and the discrete logarithm problem in polynomial time. This implies that current public-key cryptosystem such as RSA and elliptic curve cryptosystems will no longer be secure once a quantum computer is built. Due to the recent rapid development of quantum computers, NSA(National Security Agency) announced the plan for transition to post quantum cryptosystems(PQC) which have resistant against quantum computers in 2015. Then NIST(National Institute of Standards and Technology) called proposals for the PQC standardization and they started the standardization process with 69 proposals from the end of 2017. This talk introduces some typical PQC candidates and discusses their problems to apply them to current ICT systems. Finally, I will show our system called Giophantus<sup>TM</sup> which provides a solution to the problems.

10 月 23 日 (火)

9:30 – 10:30 **M. W. Wong** (York University, Toronto, Canada)

**Continuous inversion formulas for multi-dimensional modified Stockwell transforms**

We introduce multi-dimensional modified Stockwell transforms that include multi-dimensional Gabor transforms as special cases. Continuous inversion formulas for multi-dimensional modified Stockwell transforms are given.

10:45 – 11:45 守本晃 (大阪教育大学) Akira Morimoto

**Image separation using wavelet analysis**

An image separation problem is considered, where observed images are weighted superpositions of translations and rotations of original images. Using wavelet analysis, algorithms to estimate the number of original images, relative rotation angles, and relative translation parameters for observed images are proposed.

13:15 – 14:15 藤井克哉 (筑波大学) Katsuya Fujii

**On an  $\alpha$  th order fractional Radon transform and a wave type of equation**

The Fourier slice theorem holds for the classical Radon transform. We show a fractional Radon transform for which a sort of Fourier slice theorem also holds, and then present an inversion formula. The fractional Radon transform is shown to be characterized by the multi-dimensional case of a wave type of equation in analogy to the classical Radon transform.

14:30 – 15:30 竹本 奈央 (奈良女子大学) Nao Takemoto

**Some variations of wavelet and Stockwell reconstruction formulae**

The classical wavelet inversion formula is usually given under the familiar admissibility condition about wavelets. However, an alternative wavelet inversion formula considered by Lebedeva and Postnikov in 2014 is applicable even if the admissibility condition is not satisfied. Specifically, we give a multidimensional version of their formula and an inversion formula for the Stockwell transforms.

この RIMS 共同研究に関する情報は、

▷ <http://www.osaka-kyoiku.ac.jp/~ashino/rims2018/>

をご覧ください。

参加希望者 (講演者を除く) は 9 月 28 日 (金) までに、芦野宛にメールでお知らせ下さい。プログラムのアップデート等の情報を送付いたします。

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