Sophia University
Mathematics Colloquium

When: Friday, July 14, 2017, 17:30-18:30

Where: Room No. 201, Main Bldg., Ichigaya-Campus

Speaker: Shinya Moritoh / 森藤　紳哉氏
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Title: Some transformations in analysis: Fourier, wavelet, and Radon

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Abstract: Fourier, wavelet, and Radon transformations are first introduced. It is surprising that Fourier's statement is effective even today. He claims that every function can be described as a linear combination of trigonometric functions. In modern harmonic analysis, we deal with various methods of decomposing functions and operators, as Fourier himself did in his analysis of heat equations.

In this colloquium, I will talk about modern harmonic analysis with its history as well as my research activity. My research deals with dyadic decompositions of phase space, which are also very important in harmonic analysis. They lead to various function spaces including Sobolev, Hölder, and Besov spaces. Wavelets are useful for characterizations of those spaces. Many ideas of microlocal analysis are also closely related with my research.

My talk consists of the following contents.

1. Introduction: Fourier and wavelet transformations, function spaces;
2. Reproducing formula: Fourier's statement, definition of wavelets;
3. Discretization: multiresolution analysis, regularity of functions at a point;
4. Operators: differentiation and multiplication, pseudodifferential operators;
5. Two-microlocal spaces and ridgelets: detection of line singularities, Radon transformation.