

# SUDA Lie Groups Lectures II

Speaker: Jing-Song Huang (HKUST)

Title: Segal-Shale-Weil Representations and  
Universal Fourier Transforms

Time: 2020-10-27, 8pm-9pm (Beijing Time)  
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## Abstract:

The Fourier transform decomposes a function (typically a function of time or a signal) into its constituent frequencies. It has been widely used in science and engineering. Still, it plays a significant role in current development of mathematics, for instance, in the recent progress of spherical packing problem as it can simultaneously diagonalize the translations and make periodic structure easier to understand.

The Fourier transform is the unique unitary intertwiner for the Segal-Shale-Weil representation. It arises from an element of (the metaplectic cover of) the symplectic group  $Sp(2n, \mathbb{R})$ . Similar to the existence of the Casimir element corresponding to the Laplacian operator for any reductive Lie algebra, the Fourier element exists for any reductive Lie group and it defines an intertwiner for all unitary representations.

We will demonstrate this Fourier element is interesting for understanding the structure and classification of irreducible unitary representations of real reductive Lie groups.

## About the speaker:

Jing-Song Huang is currently a Chair Professor of Mathematics at the Hong Kong University of Science and Technology. He received bachelor's degree from Beijing University in 1984 and Ph D at MIT in 1989 under direction of David A. Vogan, Jr. He is a recipient of the State Science Award (2002) and the Crouch Senior Research Award (2004).

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