

## IMS DISTINGUISHED VISITOR LECTURE SERIES

### Proper actions and representation theory

Toshiyuki Kobayashi

In the series of lectures, I plan to explain some recent topics on proper actions with emphasis on their relation to representation theory. I begin with some geometric problems of group actions including properness criterion for reductive homogeneous spaces. In turn, I introduce a “quantification” of proper actions and bring geometric ideas to analytic representation theory such as temperedness criterion. Basic notions will be illustrated by examples. No special background knowledge will be required.

**Tutorial Part I:** 1 July 2022 (Friday), 11am–12noon

**Tutorial Part II:** 2 July 2022 (Saturday), 10.30–11.30am

**Tutorial Part III:** 4 July 2022 (Monday), 10.30–11.30am

### Harish-Chandra's admissibility theorem and beyond

Toshiyuki Kobayashi

Let  $G$  be a real reductive linear Lie group, and  $K$  a maximal compact subgroup of  $G$ . Harish-Chandra's admissibility theorem asserts that any irreducible unitary representation decomposes into a direct sum of irreducible  $K$ -modules with each multiplicity finite. In this talk, we consider a non-compact reductive subgroup  $G'$  instead of compact  $K$ , and discuss the restriction of an irreducible representation of  $G$  to the subgroup  $G'$  with focus on  $G'$ -admissible property (i.e. discretely decomposable with finite multiplicity) as well as on uniformly bounded multiplicity property.

**Date and Time:** 9 July 2022 (Saturday), 9–10am

The talks are part of the program on *Representations and Characters: Revisiting the Works of Harish-Chandra and André Weil* – A satellite conference of the virtual ICM 2022 (1–15 July 2022)

**Program webpage**

<https://tinyurl.com/harishjuly2022>

**Venue**

IMS Auditorium

National University of Singapore

3 Prince George's Park Singapore 118402

**Registration**

<https://tinyurl.com/ImRepresentationsReg>



**Professor Toshiyuki Kobayashi**  
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Toshiyuki Kobayashi is a professor at the University of Tokyo. He joined the faculty there in 1987 before obtaining Ph.D (1990). He worked also for RIMS Kyoto (2001-2007), Kavli IPMU (joint appointment, 2011-2022), and for Harvard, Yale, IAS, MPI, Mittag-Leffler Institute and Paris 6,7 among others, as visiting professors.

His research interests include non-commutative harmonic analysis, Lie groups and representation theory. Professor Kobayashi is known for his pioneering works on “Discontinuous Groups beyond the classical Riemannian setting”, and “Branching Problems of Unitary Representations”, “Visible Actions on Complex Manifolds”, and “Geometric Analysis on Minimal Representations, among others”.

Professor Kobayashi is a fellow of the American Mathematical Society, and recipient of the Humboldt Research Award (Germany), the Inoue Prize for Science, Spring Prize of Mathematical Society of Japan, Doctor Honoris Causa (France), JSPS Prize, and Medal with Purple Ribbon (Japan). He is an invited speaker of ICM2002 (Beijing), a plenary lecturer of Pan-African Congress of Mathematicians, Sackler Distinguished Lecture (Israel), Kemeny Lecture (USA), and Monna Lecture (Netherlands).

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