

## 2022 POSTECH-PMI Lecture series

A mini-course on

**“complex abelian varieties and Siegel modular varieties”**

Lecturer: Professor Chia-Fu Yu (Academia Sinica, Taiwan)

Online Zoom (Host: POSTECH Mathematical Institute)

Dates and Time (Korean time)

20221119 10:00am-11:30am Online Zoom

20221126 10:00am-11:30am Online Zoom

20221203 10:00am-11:30am Online Zoom

20221210 10:00am-11:30am Online Zoom

20221217 10:00am-11:30am Online Zoom

Goal and Outline:

Abelian varieties are one of important topics in algebraic geometry and number theory. There are many deep and interesting results established and also many problems to be investigated in the theory of abelian varieties. Thus, it is useful to learn abelian varieties more. This short course is mainly for graduate students, and The goal is to introduce the analytic theory of abelian varieties and their moduli spaces.

We will discuss the following topics in details:

Elliptic curves and modular curves, complex tori, line bundles, classification of line bundles on complex tori, cohomology groups of complex tori and abelian varieties, ample and very ample line bundles and projective morphism, the Riemann-Lefschetz theorem, polarizations and dual abelian varieties, construction of abelian varieties: moduli and CM abelian varieties, Jacobians, Riemann bilinear relations, endomorphism algebras of abelian varieties.

Prerequisite: Graduate Algebra, Complex analysis, and notions of complex manifolds, algebraic varieties and sheaf cohomology will be helpful.

References:

[1] David Mumford, Abelian varieties. Chap. 1

[2] Olivier Debarre, Complex tori and abelian varieties.

[3] P. Griffiths and J. Harris, Principles of Algebraic Geometry. Chap. 2  
Sections 2 and 6.

[4] Ching-Li Chai, The period matrices and theta functions of Riemann.  
Available in his homepage.

Contact: YoungJu Choie ([yjc@postech.ac.kr](mailto:yjc@postech.ac.kr))

PMI : Suhyeon Cho ([jjin1115@postech.ac.kr](mailto:jjin1115@postech.ac.kr))

PMI, POSTECH, Korea 82-54-279-5510