



The Hong Kong University of Science and Technology

Department of Mathematics

Hong Kong Geometry Colloquium

Admissible height pairings of algebraic cycles

By

Prof. Shouwu ZHANG

Princeton University and IAS of HKUST

Abstract

For a smooth and projective variety X over a global field of dimension n with an adelic polarization, we propose canonical local and global height pairings for two cycles Y, Z of pure dimension p, q satisfying $p+q=n-1$. We will give some explicit arichmedean local pairings by writing down explicit formula for the diagonal Green current for some Shimura varieties.

Date : Saturday, 10 February 2018

Time : 10:00a.m.-11:00a.m.

***Venue : Room 4504, Academic Building
(near Lifts 25&26), HKUST***

**Point-arrangements in the real projective spaces
and the Fibonacci polynomials**

By

Prof. Masaaki YOSHIDA

Kyushu University, Japan

Abstract

In this report, arrangements of $n + 2$ points in general position in the real projective n -space are unique up to projective transformations. Those of $m := n + 3$ points are projectively not unique, but they are combinatorially unique. We are interested in arrangements of m points which admit an action of the cyclic group of order m .

Let p_1, \dots, p_{n+2} be $n + 2$ points in general position. We add another point p_m and require that the m points p_1, \dots, p_{n+2}, p_m admit a projective transformation σ inducing the cyclic permutation:

$$\sigma : p_1 \rightarrow p_2 \rightarrow \dots \rightarrow p_{n+2} \rightarrow p_m \rightarrow p_1$$

There always exist such p_m and σ , and in fact there are several choices in general. We show that such choices exactly correspond to the roots of the *Fibonacci polynomial* $F_n(t)$ of degree $[n/2] + 1$. And moreover, the resulting m points p_1, \dots, p_{n+2}, p_m are in general position if and only if the corresponding root is "primitive", i.e., a root of the *core Fibonacci polynomial* $f_n(t)$, which is an irreducible factor of $F_n(t)$ of degree $\varphi(m)/2$. Here, $\varphi(m)$ denoted Euler's function counting the number of positive integers less than m and co-prime to m .

Date : Saturday, 10 February 2018

Time : 11:20a.m.-12:20p.m.

***Venue : Room 4504, Academic Building
(near Lifts 25&26), HKUST***

All are welcome!

Light refreshment will be provided at Room 3493 from 11:00 am to 11:20 am