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 archimedean local pairings by writing down explicit formula for the diagonal Green current for some Shimura varieties.

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

**By Prof. Masaaki YOSHIDA**

Kyushu University, Japan

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

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

There always exist such $p_m$ and $\sigma$, 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 $\lceil n/2 \rceil + 1$. And moreover, the resulting $m$ points $p_1, \ldots, p_{n+2}, p_m$ 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 $m$.