Group 3 :

The recipe for finding the basis of the spaces of weakly holomorphic modular forms

- Speaker : Kyung Seung Lee (AORC)
- Abstract : Modular forms appear in many ways in number theory and they are presently at the center of an immense amount of research activity. Among them, the set of weakly holomorphic modular forms in known as an infinite dimensional vector space, and although the canonical basis (that is reduced row echelon basis) of the space $M_k^!(N)$ of weakly holomorphic modular forms has many arithmetical properties, the general method of obtaining the canonical basis of it is still being studied. In this talk, we discuss the recipe for finding a canonical basis of the space $M_k^!(N)$ of weakly holomorphic modular forms and its applications.

AORC Monthly Seminar

Jan. 27 (Fri), 2023 @ AORC (Online)

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AORC 응용대수 및 최적화 연구센터
Applied Algebra & Optimization Research Center

AORC Monthly Seminar

- Object : Active collaboration within and between groups, fitting the aim of SRC
- Plan : Newly-joined researchers take pivotal roles.
- Operations Committee :
  - Woocheol Choi (Committee Chair)
  - Bumtle Kang (Group 1), Juyoung Jeong (Group 2), Bomi Shin (Group 3)

Program

- 2:00 - 2:50 pm : Jinmi Hwang (Group 2) & discussion
- 3:00 - 3:50 pm : Kyung Seung Lee (Group 3) & discussion
- 4:00 - 4:50 pm : Jihyeug Jang (Group 1) & discussion

Abstracts

Group 1 :

On sequences related to the pallet loading problem

- Speaker : Jihyeug Jang (AORC)
- Abstract : The manufacturer's pallet loading problem (MPLP) is finding the maximum number of boxes that can be stacked on a given pallet, without any overlap. (It is possible to rotate the box 90 degrees.) This problem is known as the NP-hard problem, and research on finding optimal algorithms has been one of the topics of optimization theory for more than 50 years.
As the first step for analyzing MPLP, the two (or three)-dimensional problem can be reduced to one-dimension. To deal with this problem, Kathryn A. Dowsland introduced an efficient partition. In this talk, we give some enumerative properties of efficient partitions. We show that efficient partitions are closely related to the Sturmian words, which are well known objects in combinatorics.

Group 2 :

Wasserstein gradient equations on positive definite matrices

- Speaker : Jinmi Hwang (AORC)
- Abstract : We investigate Euclidean and Riemannian gradient equations on the open convex cone $\mathbb{P}_m$ of $m \times m$ positive definite Hermitian matrices

$$\nabla \left[\sum_{j=1}^{n} w_j d_W^2(X, A_j) \right] = F(X)$$

where $d_W(A, B)$ denotes the Wasserstein metric between A and B and $F(X)$ varies over differentiable vector field on $\mathbb{P}_m$. The special case where $F(X) = 0$ is the vanishing gradient equation of the weighted sum of the squares of the metrics whose unique solution is the Wasserstein mean of $A_1, \ldots, A_n$.
In this talk, We introduce some Wasserstein gradient equations. Moreover, we show that Wasserstein gradient equations have solution and study uniqueness of these solutions.