Research Highlight: Theta lifts of tempered representations

Work of Professor GAN Wee Teck

Theta correspondence is a technique for transferring representations or automorphic forms from one group to another. It has been a useful tool in the Langlands program as it gives an efficient way of constructing automorphic forms with desired properties. The subject was initiated by Roger Howe in the early 1970s, building on earlier work of Hermann Weyl, André Weil and others.

In the past few years, Prof. Gan and his collaborators [2, 3] have resolved several fundamental problems in the theory of theta correspondences. The recent paper [1] of Prof. Gan and Hiraku Atobe continues to push the boundary of our knowledge in this subject area, by determining the theta lifts of tempered representations in terms of the local Langlands correspondence.

More interestingly, in achieving this goal, they made use of the recently proven local Gan-Gross-Prasad conjecture, part of which was resolved using advances in theta correspondence to begin with. The rich interplay between these various threads of investigation has been a highlight of Prof. Gan's research work in recent years.

References

[1] H. Atobe and W.T. Gan, Local theta correspondence of tempered representations and Langlands parameters,to appear in Inventiones Math (2017).

[2] W.T. Gan and A. Ichino, The Gross-Prasad conjecture and local theta correspondence, Inventiones Math.206 (2016), no. 3, 705-799.

[3] W.T. Gan and S. Takeda, A proof of the Howe duality conjecture, J. of American Math. Society 29 (2016),no. 2, 473-493.