

# SEMINAR

## Grupo de Análise Funcional e Aplicações Functional Analysis and Applications Group

### On norm decay rates of the Fourier oscillatory integral operators with real-valued phases

Nguyen Minh Tuan

Viet Nam National University, Ha Noi, Viet Nam

#### Abstract

In this talk, we present our view of the history about the sharp  $L^2$ -norm decay rates for the Fourier oscillatory integral operators with real-valued phases. The presentation begins with the Corput's lemma on the Fourier oscillatory integrals [1], the Hörmander's theorem on the Fourier oscillatory integral operators with non-vanished phases [8], then combine the important postulated contributions of Phong and Stein, and Seeger for the polynomial and analytic phases [2, 3, 4, 6], and the Rychkov's proof of those for smooth phases [5], together with a recent development in the work [7] for  $L^p - L^q$  norm. Finally, we will have a discussion of the remaining problems under study on the subject. The talk is based on a joint work with Vu Nhat Huy.

#### References

- [1] A. Carbery, M. Christ, and J. Wright, Multidimensional van der Corput and sublevel set estimates, *J. Amer. Math. Soc.*, V. 12 (1999), p. 981-1015.
- [2] D. H. Phong and E. M. Stein, *Oscillatory integrals with polynomial phases*. *Invent. Math.*, V. 110 (1992), p. 39-62.
- [3] D. H. Phong and E. M. Stein, *Models of Degenerate Fourier Integral Operators and Radon Transforms*. *Ann. of Math.*, V. 140 (1994), p. 703-722.
- [4] D. H. Phong and E. M. Stein, *Newton Polyhedron and Oscillatory integral operators*. *Acta Math.*, V. 179 (1997), p. 105-152.
- [5] V. S. Rychkov, *Estimates for oscillatory integral operators*, PhD. Dissertation, Faculty of Princeton University, 2008.
- [6] A. Seeger, *Degenerate Fourier integral operators in the plane*, *Duke Math. J.*, 71 (1993), p. 685-745.
- [7] Z. Shi, D. Yan, *Sharp  $L^p$ -boundedness of oscillatory integral operators with polynomial phases*, *Math. Z.*, V. 286 (2017), p. 1277-1302.
- [8] E. M. Stein, *Harmonic Analysis*. Princeton Univ. Press, Princeton, New Jersey, 1993.

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