


复旦大学数学科学学院

数学综合报告会

报告题目：Estimates for Oscillatory Integrals with Damping Factors

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地点：光华楼东主楼1601

报告摘要:

Let σ be the surface measure on a smooth hypersurface ^{1}. A fundamental subject in harmonic analysis is to determine the decay of σ. For nondegenerate , the stationary phase method yields the optimal decay, while sharp bounds in the degenerate case are known only in limited situations. In this work, we are concerned with the oscillatory estimate

$|(\kappa^{12}\sigma)(\xi)| \le C|\xi|^{2}$,

for convex analytic surfaces , where κ is the Gaussian curvature. The damping factor κ^{12} is expected to recover the optimal decay, as suggested by the stationary phase expansion, but the work of Cowling – Disney – Mauceri – Muller shows that such bounds fail in general for $d \ge 5$ even when the surface is convex and analytic. However, it has remained open whether the estimate holds in lower dimensions $2 \le d \le 4$. We establish it for d = 2, 3, and with a logarithmic loss for d=4. Our approach is inspired by the stationary set method of Basu – Guo – Zhang – Zorin- Kranich. We also discuss applications to convolution, maximal, and adjoint restric- tion operators. This is joint work with Sewook Oh.

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