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Xiaochun Li* (xcli@math.uiuc.edu), Department of Math., University of Illinois at Urbana-Champaign, Urbana, IL 60802. *Some problems on multilinear oscillatory integrals.*

The oscillatory integrals have been an essential part of analysis. There are numerous applications in number theory and analysis which depend on the theory of oscillatory integrals. Some examples include the distribution of lattice points, the estimates of exponential sums, and singular integrals along curves.

Christ, Li, Tao, and Thiele established L^p estimates for multilinear integral operators of Calderón-Zygmund type which incorporate oscillatory factors e^{iP} , where P is a real-valued polynomial. The proof is based on a decay estimate of a multilinear oscillatory integrals. In the bilinear case, the main tool used in the proof is a standard TT^* method. This method and the stability of the critical point of the phase function yield an $L^2 \times L^\infty \rightarrow L^2$ estimate for the bilinear oscillatory integrals along polynomial curves, which is a joint work with D. Fan.

The relation between multilinear singular integrals along curves and multilinear oscillatory integrals is only partially understood at this time. Many problems pertaining to multilinear operators along curves and multilinear oscillatory integrals are still open. Some of them will be posed in this talk. (Received February 12, 2008)