**Meeting:** 1007, Santa Barbara, California, SS 10A, Special Session on Complexity of Computation and Algorithms

1007-65-56 **Grzegorz W Wasilkowski*** (greg@cs.uky.edu), Department of Computer Science, 773 Anderson Hall, University of Kentucky, Lexington, KY 40506. *Polynomial-Time Algorithms for Multivariate Linear Problems with Finite-Order Weights.*

There is a host of practical problems that deal with functions of very many variables. As observed in a number of papers, some of those problems (e.g., in mathematical finance or physics) deal with functions which only depend on groups of few variables. That is, the functions depend on all $d$ variables; however, they are sums of terms each of which depends only on few, say $q^*$, variables. For some applications, the number $q^*$ is fairly small, e.g., $q^* = 1$ or 2. Such problems can be modeled by so called weighted tensor product Hilbert spaces with *finite-order* weights. In this talk we present resent results on tractability of such problems. More specifically, assuming that the univariate problem admits algorithms reducing the initial error by $\epsilon$ in cost proportional to $\epsilon^{-p}$, we provide a construction of algorithms $A_{d,\epsilon}$ for the general $d$-variate problem reducing the initial error $\epsilon$ times in cost essentially bounded by $\epsilon^{-p}\, d^q$ for $q$ independent of $d$ and $n$. The exponent $q$ depends on $q^*$ and often $q = q^*$, i.e., it is small. (Received January 19, 2005)