Philadelphia Area Number Theory Seminar

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Simultaneous additive equations

Abstract: We describe recent joint work with J. Brandes concerning upper bounds on the number of variables required to establish local-to-global principles, both for existence of solutions and for asymptotic formulae, for systems of diagonal polynomial equations. Previous work on this topic has focused on systems in which all forms have the same degree or on systems in which at most one form of each degree appears, and the two cases demand quite different approaches via the circle method. Our new results include systems in which differing degrees may occur with multiplicities exceeding one, and the arguments therefore require a hybrid of the two existing approaches. Apart from the general estimates of Schmidt and very recent work of Browning and Heath-Brown, which give weak conclusions when specialized to the diagonal case, this is the first result on systems with both repeated and differing degrees.