Polynomial inequalities on subanalytic sets

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The classical inequalities like those of Bernstein, Markov or Jackson are crucial in the approximation of functions. They are well understood in the one-dimensional setting. Their multivariate versions require, however, application of essentially stronger methods. A satisfactory theory of such inequalities has been developed due to applications of both pluripotential methods based on the Bedford-Taylor theory of the complex Monge-Ampère operator and the Gabrielov-Hironaka-Łojasiewicz subanalytic geometry. The application of the latter theory to approximation problems has unexpectedly yielded very effective tools that permit one to overcome difficulties related to the geometry of multidimensional sets (e.g. cuspidal sets problems). The goal of my talk is to present some of the most spectacular results obtained by such an approach.