Evgeny A Poletsky* (eapolets@syr.edu), Department of Mathematics, 215 Carnegie Hall, Syracuse University, Syracuse, NY 13244. Transcendence measures and algebraic growth of entire functions.

In this joint work with Dan Coman we obtain estimates for certain transcendence measures of an entire function \( f \). Using these estimates, we prove Bernstein, doubling and Markov inequalities for a polynomial \( P(z, w) \) in \( \mathbb{C}^2 \) along the graph of \( f \). These inequalities provide, in turn, estimates for the number of zeros of the function \( P(z, f(z)) \) in the disk of radius \( r \), in terms of the degree of \( P \) and of \( r \).

Our estimates hold for arbitrary entire functions \( f \) of finite order, and for a subsequence \( \{n_j\} \) of degrees of polynomials. But for special classes of functions, including the Riemann \( \zeta \)-function, they hold for all degrees and are asymptotically best possible. From this theory we derive lower estimates for a certain algebraic measure of a set of values \( f(E) \), in terms of the size of the set \( E \). (Received October 04, 2004)