Random Analytic Functions with Polynomial Growth Rate

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Abstract

Let $f(z) = a_0 + a_1 z + a_2 z^2 + \cdots$ be an analytic function over the unit disk in the complex plane. Let

$$Rf(z) = \pm a_0 \pm a_1 z \pm a_2 z^2 \pm \cdots$$

be its randomization. We characterize those $f(z)$, in terms of coefficients, s uch t hat $R\ f$ h as a p olynomial g rowth r ate a lmost surely. We show that the rate is almost surely a constant, leading to a well defined n otion o f g rowth r ate f or $R\ \ f$. T hen w e s how t hat t he rate of Rf is improved when compared with that of f, and the order of improvement is at most $1/2$. The proof relies the Dudley-Fernique entropy integrals, as reformulated by Marcus and Pisier.

(Joint work with Pham Trong Tien at Vietnam National University, Hanoi)