1150-32-169 **Stéphanie NIVOCHE***, CNRS and Laboratoire J.-A. Dieudonné, U.M.R. 7351, Université Côte d'Azur, 06108 Nice Cedex 02, France, and **Oscar BANDTLOW**, School of Mathematical Sciences, Queen Mary University of London, London E3 4NS, United Kingdom. *New solution of a problem of Kolmogorov on width asymptotics in holomorphic function spaces.* Preliminary report.

Given a domain D in $\mathbb{C}^n$ and K a compact subset of D, the set $\mathcal{A}_K^D$ of all restrictions of functions holomorphic on D the modulus of which is bounded by 1 is a compact subset of the Banach space $C(K)$. The sequence $(d_m(\mathcal{A}_K^D))_{m\in\mathbb{N}}$ of Kolmogorov m-widths of $\mathcal{A}_K^D$ provides a measure of the degree of compactness of the set $\mathcal{A}_K^D$ in $C(K)$. In the 1980s Zakharyuta showed that for suitable D and K the asymptotics

$$\lim_{m\to\infty} \frac{-\log d_m(\mathcal{A}_K^D)}{m^{1/n}} = 2\pi \left(\frac{n!}{C(K,D)}\right)^{1/n}, (*)$$

where $C(K,D)$ is the relative capacity of K in D, is implied by a conjecture, now known as Zakharyuta's Conjecture. This conjecture was proved by Nivoche in 2004 thus settling (*) at the same time.

We shall give a new proof of the asymptotics (*) which does not rely on Zakharyuta's Conjecture. Instead we proceed more directly by a two-pronged approach establishing sharp upper and lower bounds for the Kolmogorov widths. The lower bounds follow from concentration results for the eigenvalues of a Toeplitz operator, while the upper bounds follow from an exhaustion procedure by special holomorphic polyhedra. (Received July 08, 2019)