The Dirichlet-Bohr radius

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Denote by $\Omega(n)$ the number of prime divisors of $n \in \mathbb{N}$ (counted with multiplicities). For $x \in \mathbb{N}$ define the Dirichlet-Bohr radius L_x to be the best $r > 0$ such that for every finite Dirichlet polynomial $\sum_{n=1}^{x} a_n n^{-s}$ we have $\sum_{n=1}^{x} |a_n| r^{\Omega(n)} \leq \sup_{t \in \mathbb{R}} \left| \sum_{n=1}^{x} a_n n^{-it} \right|$. We prove that the asymptotically correct order of L_x is $(\log x)^{1/4} x^{-1/8}$. Following Bohr's vision our proof links the estimation of L_x with classical Bohr radii for holomorphic functions in several variables. Moreover, we suggest a general setting which allows to translate various results on Bohr radii in a systematic way into results on Dirichlet Bohr radii, and vice versa.