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Non-asymptotic results on the zero distribution of the entire function $f_a(z) = \sum_{k=0}^{\infty} \frac{z^k}{a^{k^2}}$, $a > 1$, and its Taylor sections

The distribution of zeros of the entire function $f_a(z)$ and its Taylor sections is the subject of investigation in various extremal problems. In the talk we present the answers to some questions of the kind: for which a the function $f_a(z)$ (or its Taylor sections) has only real zeros, has all zeros in the left half-plane, etc. We show that for every $a > 1$ this function has infinitely many real zeros. We also present a few other non-asymptotic results about the zero distribution of the function f_a and its Taylor sections.