Large Sieve Inequalities via Subharmonic Methods and the Mahler Measure of the Fekete Polynomials

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Abstract. We investigate large sieve inequalities such as

$$\frac{1}{m} \sum_{j=1}^{m} \psi(\log |P(e^{i\tau_j})|) \leq \frac{C}{2\pi} \int_{0}^{2\pi} \psi(\log |e^{i\tau} P(e^{i\tau})|) \, d\tau,$$

where $\psi$ is convex and increasing, $P$ is a polynomial or an exponential of a potential, and the constant $C$ depends on the degree of $P$, and the distribution of the points $0 \leq \tau_1 < \tau_2 < \cdots < \tau_m \leq 2\pi$. The method allows greater generality and is in some ways simpler than earlier ones. We apply our results to estimate the Mahler measure of Fekete polynomials.