THE MAXIMUM MODULUS AND VALENCY OF FUNCTIONS MEROMORPHIC IN THE UNIT CIRCLE.

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Introductory Abstract

1) Let E be a closed set of complex values w containing $w = 0, \infty$ and at least one other finite value. Let $p(\varrho)$ be an increasing positive function defined for $0 \le \varrho < 1$.

We consider in this essay a function $f(z)$ meromorphic in $|z| < 1$ and such that none of the equations

$$f(z) = w,$$

where w lies in E, have more than $p(\varrho)$ roots in $|z| \le \varrho$, $0 < \varrho < 1$. In other words the valency of $f(z)$ on the set E is at most $p(\varrho)$ in $|z| < \varrho$, $0 < \varrho < 1$. We shall also say sometimes that $f(z)$ takes no value w of E more than $p(\varrho)$ times in $|z| \le \varrho$.

Our aim is to find bounds under this hypothesis for the maximum modulus of $f(z)$

$$M[\varrho, f(z)] = \max_{0 \le \theta \le 2\pi} |f(\varrho e^{i\theta})|.$$