Abstract

Let \( U = \{ z \in \mathbb{C} : |z| < 1 \} \), let \( a_1, \ldots, a_n \) be holomorphic functions on \( U \), and set

\[
F(z) = \{ w \in \mathbb{C} : w^n + a_1(z)w^{n-1} + \cdots + a_{n-1}(z)w + a_n(z) = 0 \} \quad (z \in U).
\]

We show that

\[
\Delta_\tau(F(z_1), F(z_2)) \leq \tau(z_1, z_2)^{1/n} \quad (z_1, z_2 \in U),
\]

where \( \Delta_\tau \) denotes the Hausdorff distance between two sets, measured with respect to the hyperbolic pseudo-metric \( \tau \) on \( U \). We further show that

\[
D_\tau(F(z_1), F(z_2)) \leq k(\tau(z_1, z_2)^{2/n}) \quad (z_1, z_2 \in U),
\]

where \( D_\tau \) denotes the matching distance between two \( n \)-tuples, again measured with respect to \( \tau \), and where \( k \) is the elliptic modulus function. Two examples are given relating to the sharpness of these inequalities.