1163-41-1191 **Xin Li*** (`xin.li@ucf.edu`). *A weighted max-min-max problem on the unit circle.*

For $n = 1, 2, 3, ...$, let $\{t_j\}$ be a set of n points such that

$$0 \le t_1 < t_2 < \cdots < t_n < 2\pi. \tag{1}$$

A related extremal problem is to find

$$m_n := \max_{\{t_j\}} \min_{1\le j\le n} \left(\max_{t_j \le t \le t_{j+1}} \left| \prod_{j=1}^{n} (e^{it} - e^{it_j}) \right| \right). \tag{2}$$

Khrushchev (2009) proved that $m_n = 2$ and the optimal $\{t_j\}$ are equally spaced. Recently, Erdélyi, Hardin, and Saff (2015) obtained this using their inverse Bernstein inequality with the Gauss-Lucas theorem. We solve the following problem: Let $w(z)$ be a monic polynomial of degree n with no zero on the unit circle and let $\{t_j\}$ satisfy (1). Find

$$m_{n,w} = \max_{\{t_j\}} \min_{1\le j\le n} \left(\max_{t_j \le t \le t_{j+1}} \left| \frac{\prod_{j=1}^{n} (e^{it} - z_j)}{w(e^{it})} \right| \right).$$

This is a weighted version of (2). Although there is a version of inverse Bernstein inequality, but there is no analogue of Gauss-Lucas theorem for our situation. Indeed, we find that a zero-counting argument is enough. As a by-product, we provide an alternative, more elementary proof even for the polynomial case. (Received September 15, 2020)