Lejla Smajlović, Zenan Šabanac, and Lamija Šćeta
On the Hurwitz-type zeta function associated to the Lucas sequence,
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Abstract

We study the theta function and the Hurwitz-type zeta function associated to the Lucas sequence $U = \{U_n(P,Q)\}_{n\geq 0}$ of the first kind determined by the real numbers P, Q under certain natural assumptions on P and Q. We deduce an asymptotic expansion of the theta function $\theta_U(t)$ as $t \downarrow 0$ and use it to obtain a meromorphic continuation of the Hurwitz-type zeta function $\zeta_U(s,z) = \sum_{n=0}^{\infty} (z+U_n)^{-s}$ to the whole complex $s-$plane. Moreover, we identify the residues of $\zeta_U(s,z)$ at all poles in the half-plane $\Re(s) \leq 0$.