

1116-30-2227

**Lukasz Grabarek\*** (lgrabarek@matsu.alaska.edu), P.O. Box 2889, Palmer, AK 99645. *On stability preserving properties of coefficient-wise transformations.* Preliminary report.

The Laguerre-Pólya class of entire functions consists of precisely those functions that can be approximated, uniformly on compacta, by real polynomials all of whose zeros are real. Necessary and sufficient conditions for membership in the Laguerre-Pólya class are of particular interest.

The non-linear, coefficient-wise transformation  $a_k \mapsto a_k^2 - a_{k-1}a_{k+1}$ , maps polynomials with real and negative zeros to polynomials of the same kind. This transformation extends to transcendental entire functions, enjoys stability preserving properties, is the building block of a class of coefficient-wise transformations, and thus characterizes a class of necessary conditions for membership in the Laguerre-Pólya class. A joint work with M. Chasse and M. Visontai extends the stability preserving properties of  $a_k \mapsto a_k^2 - a_{k-1}a_{k+1}$  to certain sequences of polynomials, i.e., the polynomial  $P_{k+1}^2 - P_k P_{k+2}$  will be (weakly) Hurwitz stable provided the sequence  $\{P_k\}_{k=0}^\infty$  of simple polynomials satisfies certain first-order differential recurrences.

This talk is a survey of results concerning non-linear, coefficient-wise transformations, analogous transformations on sequences of polynomials, and their stability preserving properties. (Received September 22, 2015)