ICM 1998, Berlin, Aug. 18–27

Abstracts of Short Communications and Posters

Section:

8. Analysis

1991 MS Classification: 39, 26
Gilányi, Attila, Lajos Kossuth University, Debrecen, Hungary
On polynomial functions, monomial functions and the Dinghas interval derivative

A real function f is called a polynomial function of degree n if $\Delta_y^{n+1} f(x) = 0$ for all $x, y \in \mathbb{R}$, f is said to be a monomial function of degree n if $\Delta_y^n f(x) - n! f(y) = 0$ $(x, y \in \mathbb{R})$, where n is a positive integer and Δ denotes the well-known difference operator. In this talk characterization and stability theorems for functions satisfying these equations are presented using, for a nonnegative real number α, the generalization of the Dinghas interval derivative

$$D^{n,\alpha} f(\xi) = \lim_{\substack{(x,y)\to(\xi,0)\\ x\le\xi\le x+ny}} \frac{\Delta_y^n f(x)}{y^\alpha}$$

and the operator

$$\tilde{D}^{n,\alpha} f(\xi) = \lim_{\substack{(x,y)\to(\xi,0)\\ x\le\xi\le x+ny}} \frac{\Delta_y^n f(x) - n! f(y)}{y^\alpha}.$$

The given results are connected to some works of A. Dinghas and P. Volkmann on the interval derivative above.