

# THE STABILITY OF GENERALIZED POLYNOMIAL (GP) FUNCTIONS OF DEGREE 2

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ABSTRACT. (Joint work with Kil-Woung Jun and Dal-Won Park)

A function  $p : V \rightarrow W$  is called a generalized Polynomial (GP) function of degree 2 provided there exist  $a_0 \in W$  and symmetric  $k$ -additive functions  $a_k : V^k \rightarrow W$  (for  $1 \leq k \leq 2$ ) such that

$$p(x) = a_0 + \sum_{k=1}^2 a_k^* \text{ for all } x \in V \text{ and } a_2^* = 0.$$

Consider the functional equations

$$(1) f(2x + y) - 3f(x + y) + 3f(y) - f(y - x) = 0,$$

$$(2) f(x + y) + g(x - y) + hf(x) + k(y) = 0,$$

$$f(2x + y) + g(x + y) + h(y) + kf(y - x) = 0.$$

The functions satisfying the functional equations (1) and (2) are the GP functions of degree at most 2. In this paper we show that the GP functions of degree at most 2 is the general solution of (3) and investigate the stability problem of (3).

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