Solving linear functional equations with computer

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(Joint work with Gergő Borus)

In the present talk, we consider the class of functional equations

$$\sum_{i=0}^{n+1} f_i(p_i x + q_i y) = 0 \qquad (x, y \in L),$$

where n is a positive integer, $p_0, p_1, \ldots, p_{n+1}$, $q_0, q_1, \ldots, q_{n+1}$ are rational numbers, L, M are linear spaces over the rationals and $f_0, f_1, \ldots, f_{n+1} : L \to M$ are unknown functions. We present a computer program developed in the computer algebra system MAPLE, which solves equations of the type above. Our algorithm is based on some theoretical results by László Székelyhidi (c.f. [2] and [3]). It is a new, more general and more effective version of the program presented in [1].

References

[1] A. Gilányi, *Solving linear functional equations with computer*, Math. Pannon. **9** (1998), 57–70.

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[3] L. Székelyhidi, *Convolution Type Functional Equations on Topological Abelian Groups*, World Sci. Publ. Co., Singapore, 1991.