Recent results on the semilinear formal power series

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Abstract

We continue in this paper the investigations on the notion of semilinearity for formal power series (in commuting variables), recently introduced in Petre, 1999. We prove several results connected to the difference operation on semilinear power series, as well as results on possible decompositions of semilinear series into finite sums of linear series with disjoint supports.

Résumé

Nous poursuivons dans cet article les investigations sur la notion de semilinéarité des séries formelles (en variables commutatives), récemment introduit par Petre, 1999. Nous prouvons plusieurs résultats concernant la différence de deux séries semilinéaires, ainsi que d'autres résultats portant sur de possibles décompositions de séries semilinéaires en sommes finies de séries linéaires ayant supports disjoints.

1 Introduction

The semilinearity is a central notion in the theory of formal languages, which has been considered only recently for formal power series. The family of semilinear formal power series has been introduced in [8] as a natural generalization of the notion of semilinear subsets of a commutative monoid (see [3]). As noticed already in [8], the semilinear power series (in commuting variables) have in general similar behavior as the semilinear languages over a commutative monoid: they are closed under rational operations (and thus coincide with the family of rational power series) if the coefficients are taken in an idempotent, commutative semiring, are closed under morphisms, and the well known Parikh's Theorem holds for an idempotent,

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