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Rees matrix seminearring

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As a continuation of the work done in (R. Mukherjee (Pal), P. Pal and S. K. Sardar, On additively completely regular seminearrings, *Commun. Algebra* **45**(12) (2017) 5111–5122), in this paper, our objective is to characterize left (right) completely simple seminearrings in terms of Rees Construction by generalizing the concept of Rees matrix semigroup (J. M. Howie, *Fundamentals of Semigroup Theory* (Clarendon Press, Oxford, 1995); M. Petrich and N. R. Reilly, *Completely Regular Semigroups* (Wiley, New York, 1999)) and that of Rees matrix semiring (M. K. Sen, S. K. Maity and H. J. Weinert, Completely simple semirings, *Bull. Calcutta Math. Soc.* **97** (2005) 163–172). In Rees theorem, a completely simple semigroup is coordinatized in such a way that each element can be seen to be a triplet which gives this abstract structure a much more simpler look. In this paper, we have been able to construct a similar kind of coordinate structure of a restricted class of left (right) completely simple seminearrings taking impetus from (M. P. Grillet, Semirings with a completely simple additive semigroup, *J. Austral. Math. Soc.* **20**(Ser. A) (1975) 257–267, Theorem 4) and (M. K. Sen, S. K. Maity and H. J. Weinert, Completely simple semirings, *Bull. Calcutta Math. Soc.* **97** (2005) 163–172, Theorem 3.1).

Keywords: Rees matrix seminearring; left completely simple seminearring; right completely simple seminearring.

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1. Introduction

A *near-ring* is a non-empty set N together with two binary operations "+" and "·" such that (i) $(N, +)$ is a group (not necessarily abelian), (ii) $(N, \cdot)$ is a semigroup (not necessarily commutative), and (iii) for all $n_1, n_2, n_3 \in N$, $(n_1 + n_2) \cdot n_3 = n_1 \cdot n_3 + n_2 \cdot n_3$, i.e., "·" distributes over "+" from the right side ("right distributive law") [21]. It is well known that the set $M(G)$ of all self-maps of an additive group G

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