Full PDF

DM-GAA Page

NONDISTRIBUTIVE RINGS AND THEIR ÖRE LOCALIZATIONS

Małgorzata Elżbieta Hryniewicka

Institute of Mathematics
University of Białystok
Ciołkowskiego 1M, 15–245 Białystok, Poland

e-mail: margitt@math.uwb.edu.pl

Abstract

In the paper, we introduce the notion of a nondistributive ring N as a generalization of the notion of an associative ring with unit, in which the addition needs not be abelian and the distributive law is replaced by $n0 = 0n = 0$ for every element n of N. For a nondistributive ring N, we introduce the notion of a nondistributive ring of left quotients $S^{-1}N$ with respect to a multiplicatively closed set $S \subseteq N$, and determine necessary and sufficient conditions for the existence of $S^{-1}N$.

Keywords: semigroups, nearrings, nondistributive rings, nearrings of quotients, nondistributive rings of quotients, Öre localizations of nondistributive rings.

2010 Mathematics Subject Classification: 16Y99, 16Y30, 12K05, 16S85, 16U20.

References

[1] K.L. Chew and G.H. Chan, *On extensions of near-rings*, Nanta Math. **5** (1971) 12–21.

[2] J.R. Clay, Nearrings, geneses and applications (Oxford Science Publications, The Clarendon Press, Oxford University Press, New York, 1992).

[3] C.C. Ferrero and G. Ferrero, Nearrings, some developments linked to semigroups and groups (Advances in Mathematics (Dordrecht) 4, Kluwer Academic Publishers, Dordrecht, 2002).

[4] L.E. Dickson, *Definitions of a group and a field by independent postulates*, Trans. Amer. Math. Soc. **6** (1905) 198–204.
doi:10.1090/S0002-9947-1905-1500706-2

[5] D. Dorninger, H. Länger and M. Mączyński, *Ring-like structures with unique symmetric difference related to quantum logic*, Discuss. Math. Gen. Algebra Appl. **21** (2001) 239–253.
doi:10.7151/dmgaa.1041

[6] K. Głazek, A guide to the literature on semirings and their applications in mathematics and information sciences with complete bibliography (Kluwer Academic Publishers, Dordrecht, 2002).

[7] J.A. Graves and J.J. Malone, *Embedding near domains*, Bull. Austral. Math. Soc. **9** (1973) 33–42.
doi:10.1017/S0004972700042830

[8] A. Hajnal and A. Kertész, *Some new algebraic equivalences of the axiom of choice*, Publ. Math. Debrecen **19** (1972) 339–340.

[9] M. Holcombe, *Near-rings of quotients of endomorphism near-rings*, Proc. Edinburgh Math. Soc., II Ser. **19** (1974/1975) 345–352.
doi:10.1017/S0013091500010440

[10] T.Y. Lam, Lectures on modules and rings (Graduate Texts in Mathematics 189, Springer-Verlag, New York, 1999).

[11] S. Markov, *On the algebra of intervals*, Reliable Computing **21** (2016) 80–108.

[12] C.J. Maxson, On near-rings and near-ring modules (Doctoral dissertation, State University of New York at Buffalo, 1967).

[13] J.D.P. Meldrum, Near-rings and their links with groups (Research Notes in Mathematics 134, Pitman Advanced Publishing Program, Boston, 1985).

[14] O. Öre, *Linear equations in non-commutative fields*, Ann. Math., II Ser. **32** (1931) 463–477.
doi:10.2307/1968245

[15] A. Oswald, *On near-rings of quotients*, Proc. Edinburgh Math. Soc., II Ser. **22** (1979) 77–86.
doi:10.1017/S0013091500016187

[16] G. Pilz, Near-rings, the theory and its applications, Second edition (North-Holland Mathematics Studies 23, North-Holland Publishing Co., Amsterdam, 1983).

[17] V. Seth, Near-rings of quotients (Doctoral dissertation, Indian Institute of Technology, 1974).

[18] V. Seth and K. Tewari, *Classical near-rings of left and right quotients*, Progr. Math. (Allahabad) **12** (1978) 115–123.

[19] M. Shafi, *A note on a quotient near-ring*, Arabian J. Sci. Engrg. **4** (1979) 59–62.

[20] H.S. Vandiver, *Note on a simple type of algebra in which the cancellation law of addition does not hold*, Bull. Amer. Math. Soc. **40** (1934) 914–920.
doi:10.1090/S0002-9904-1934-06003-8

[21] H.S. Vandiver, *On the imbedding of one semi-group in another, with application to semi-rings*, Amer. J. Math. **62** (1940) 72–78.