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HOMOMORPHISMS OF NEAR-RINGS OF CONTINUOUS FUNCTIONS

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In recent papers Chew has found a class of topological rings such that if E is one of them, then a space is E-compact if and only if every E-homomorphism on $C(X, E)$ has a one-point support. We generalize this result to a class of topological near-rings. We also have found some topological near-rings which belong to this class.

Chew [5] proved that for the class of α-topological rings, $\mathscr{E}$, X is E-compact, $E \in \mathscr{E}$, if and only if every E-homomorphism on $C(X, E)$ has a one-point support. He also gave a "determination theorems."

The purpose of this paper is to show that the above results hold true for a class of topological near-rings. Since our arguments are almost identical with those of [5], we shall give only the statement of the results and the necessary definitions with a very brief indication of some proofs.

1. Preliminaries.

DEFINITION 1.1. A near-ring is a triple $\{R, +, \cdot\}$ where R is a nonempty set, each of $+$ and $\cdot$ is an associative binary operation on R such that $\{R, +\}$ is a group (need not be abelian) with identity 0, and the following are satisfied,

(a) for each x, y, and $z \in R$, $x \cdot (y + z) = x \cdot y + x \cdot z$, and

(b) for each $x \in R$, $0 \cdot x = 0$. See [1].

Note that in [2] this type of near-ring is called D-ring. Examples can be found in [2].

DEFINITION 1.2. A near-ring R that contains more than one element is said to be a division near-ring, or near-field if the set R' of nonzero elements is a multiplicative group; and 1 denotes the unity of R'. See [8] and [9].

DEFINITION 1.3. A topological near-ring is a quadruple $\{R, +, \cdot, \mathscr{T}\}$ such that $\{R, +, \cdot\}$ is a near-ring, and $\mathscr{T}$ is a Hausdorff topology on R such that the mappings

$$f: R \times R \to R \text{ defined by } f((x, y)) = x + y$$

and

$$g: R \times R \to R \text{ defined by } g((x, y)) = x \cdot y$$