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A CONSTRUCTION OF HEWITT REALCOMPACTIFICATION IN TERMS OF NETS

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Abstract. We give a construction of Hewitt realcompactification of a completely regular Hausdorff space by using nets.

1. Introduction

Throughout the paper, topological spaces are assumed to be Hausdorff. The set of real-valued continuous functions on a topological space X is denoted by $C(X)$. We consider $C(X)$ as an algebra and a Riesz space with the pointwise algebraic operations and the pointwise order. That is, for each f and g in $C(X)$ and every real number α, we define

$$(\alpha f)(x) := \alpha f(x), \quad (f+g)(x) := f(x) + g(x), \quad (fg)(x) := f(x)g(x),$$

and the corresponding order is defined by

$$f \leqslant g \quad \text{if and only if} \quad f(x) \leqslant g(x) \quad \text{in } \mathbb{R} \text{ for all } x \in X.$$

The symbol $C_b(X)$ denotes the set of real-valued continuous and bounded functions on X. Clearly, $C_b(X)$ is a subalgebra and a Riesz subspace of $C(X)$. A great deal of information about the algebras $C(X)$ and $C_b(X)$ can be found in [6].

Recall that a topological space X is called *completely regular* if for each closed set $F \subseteq X$ and $x \in X \setminus F$ there exists a bounded continuous function $f : X \to \mathbb{R}$ such that $f(x) = 1$ and $f(F) = 0$. It is well-known that for each topological space X, there exists a completely regular space Y such that $C(X)$ and $C(Y)$ are algebraically isomorphic spaces (see, [6, Theorem 3.9]).

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