Acta Mathematica Academiae Paedagogicae Nyíregyháziensis
33 (2017), 115–116
www.emis.de/journals
ISSN 1786-0091

ERRATUM TO "NEW APPROACH FOR CLOSURE SPACES BY RELATIONS"

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Abstract. In this note, an alleged lemma 3.6 stated in [2] is incorrect in general, by giving an example. In addition to this point, if the closure space studied in [2] was T_1 space, then it is the discrete space $(X, P(X))$. As a consequence, Proposition 6.4, Corollary 6.4, Proposition 6.5, Corollary 6.6, Proposition 6.6 and Corollary 6.7 mentioned in [2] are trivially satisfied without proof.

1. Introduction

Definition 1. [1] Let X be a nonempty set and R be a binary relation on X. The minimal neighbourhood of $x \in X$ is defined as:

$$\langle x \rangle_R = \cap\{pR : x \in pR\}, \tag{1}$$

where $pR = \{q \in X : (p, q) \in R\}$.

Definition 2. [2] Let R be a binary relation on a nonempty set X. The closure operation on X, denoted by cl_R, defined as follows:

$$cl_R(A) = A \cup \{x \in X : \langle x \rangle_R \cap A \neq \emptyset\}. \tag{2}$$

Theorem 1. [2] *Let R be a binary relation on a nonempty set X. Then a closure space (X, cl_R) is an Alexandrov topological space.*

Lemma 1. [3] *Let (X, τ) be an Alexandrov T_1-space. Then (X, τ) is the discrete space; that is, $\tau = P(X)$.*

Lemma 3.6 in [2] claimed that for any binary relation R on X the following implication has been satisfied:

$$x \in cl_R(\{y\}) \Rightarrow y \in \langle x \rangle_R.$$

This assertion is wrong in general by giving example.

2010 *Mathematics Subject Classification.* 54F05; 54A05.
Key words and phrases. Closure space; Alexandrov space; minimal neighbourhood.

2. Main results

The following example shows that the sufficient condition of Lemma 3.6 in [2] is incorrect in general.

Example 1. Let $X = \{a, b, c, d\}$ and $R = \{(a, a), (a, b), (b, c), (d, a)\}$. Then $\langle a\rangle_R = \{a\}$, $\langle b\rangle_R = \{a, b\}$, $\langle c\rangle_R = \{c\}$ and $\langle d\rangle_R = \emptyset$. It's clear that $d \in cl_R(\{d\}) = \{d\}$, but $d \notin \langle d\rangle_R$.

Proposition 1. *Let R be a binary relation on a nonempty set X. Then any closure space (X, cl_R) which is T_1 is the discrete space $(X, P(X))$.*

Proof. The result is a direct consequence of Theorem 1 and Lemma 1. □

Remark 1. It should be noted that Proposition 1 implies that Proposition 6.4, Corollary 6.4, Proposition 6.5, Corollary 6.6, Proposition 6.6 and Corollary 6.7 stated in [2] are trivially satisfied without proof.

References

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Received September 23, 2016.

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