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On H-Open Sets and H-Continuous Functions

Huseyin Cakalli[1]*, Fikriye Ince Dagci[2]

[1]*Maltepe University, Maltepe, Istanbul, Turkey*
[2]*Kultur University, Istanbul, Turkey*

Introduction

The author introduced a new topology depending on the original topology on a non-empty set in the paper entitled"On h-open sets and h-continuous functions" by Fadhil Abbas, published in Journal of Applied and Computational Mathematics [1]. However, there are two false theorems and two false examples, namely Theorem 3.5, Theorem 3.8, Example 2.4, and Example 2.5 are unfortunately wrong. 1) Theorem 3.5 is wrong as a counter-example is given in the following.

Counter-example to Theorem 3.5. Let $X\{a,b,c\} = \{1,2,3\}$ and τ = {∅, X, {a}, {c}, {a, c}}, σ = {∅, Y, {1}}. Then τ h = {∅, X, {a}, {c}, {a, c}}, σ^h = {∅, Y, {1}, {2, 3}}. Now define a function f: (X, τ) ⟶ (Y, σ) as f(a) = 1 , f(b) = 2 , f(c) = 3. Then it is clear that the function f is continuous. Since {2, 3} ∈ σ^h and f^{-1} ({2, 3}) = {b, c} ∈/ τ^h, f is not h-irresolute.

2) Theorem 3.8 is wrong. A counter-example is in the following.

Counter-example to Theorem 3.8 Let X=Y=Z = {a, b, c}, τ = {∅, X, {a}, {a, b}} ,

τ^h = {∅, X, {a}, {b}, {a, b}, {b, c}}, σ = {∅, Y, {a}} , σ^h = {∅, Y, {a} , {b, c}} ,

η = {∅, Z, {b, c}}, η^h = {∅, Z, {a}, {b}, {c}, {a, b}, {a, c} {b, c}} and let

f : (X, τ) ⟶ (Y, σ), g: (Y, σ) ⟶ (Z, η) be identity functions. It is clear that f is h-irresolute, g is h-continuous. Since {c} ∈ η h and $(g\circ f)$ −1 ({c}) = {c} ∈/ τ^h, $g\circ f$: (X, τ) ⟶ (Z, η) is not h-irresolute

3) In Example 2.4. The equalityD ({a, c} = {c} is not correct as well, the correct equality is D({a, c} = {b, c}

4) But not least, Example 2.5 is not correct, it is false, as b is not an h-limit point of {a, b} since {b, c} T (A − {c}) = ∅. Instead, example may be changed as in the following to get a correct sample for the converse to Theorem 2.5. Let X = {a, b, c}, τ1 = {∅, X, {a}}, τ2 = {∅, X, {a}, {a, b}}. Then τ h 1 = {∅, X, {a}, {b, c}}, τ^h 2 = {∅, X, {a}, {b}, {a, b}, {b, c}}. Now that τ h 1 ⊆τ^h 2, and b is an h-limit point of A = {a, c} with respect to τ1 while b is not h-limit point of A = {a, c} with respect to τ_2. Note that the author had taken A = {a, b}, wrongly, which made the example wrong.

5) In Definition 2.1 U 6= X is to be dropped.

6) In Theorem 3.9, the word "homomorphism" should be "homeomorphisms"

References

1. Fadhil Abbas. "On H-open sets and H-continuous functions." *J Appl Comput Math* 9(2020):1-5.

***Address for Correspondence:** Huseyin Cakalli, Maltepe University, Maltepe, Istanbul, Turkey, Tel: 905364109602, E-mail:hcakalli@gmail.com; huseyincakalli@maltepe.edu.tr*

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