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An example of a space whose all continuous mappings are almost injective

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Abstract: We show that all continuous maps of a space X onto second countable spaces are pseudo-open if and only if every discrete family of nonempty G_δ -subsets of X is finite. We also prove under CH that there exists a dense subspace X of the real line \mathbb{R} , such that every continuous map of X is almost injective and X cannot be represented as $K \cup Y$, where K is compact and Y is countable. This partially answers a question of V.V. Tkachuk in [Tk]. We show that for a compact X , all continuous maps of X onto second countable spaces are almost injective if and only if it is scattered. We give an example of a non-compact space Z such that every continuous map of Z onto a second countable space is almost injective but Z is not scattered.

Keywords: almost compact map, pseudo-open map, almost injective map, discrete family, scattered

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