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MULTIPLE FACETS OF INVERSE CONTINUITY

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Abstract. Inversion of various inclusions that characterize continuity in topological spaces results in numerous variants of quotient and perfect maps. In the framework of convergences, the said inclusions are no longer equivalent, and each of them characterizes continuity in a different concretely reflective subcategory of convergences. On the other hand, it turns out that the mentioned variants of quotient and perfect maps are quotient and perfect maps with respect to these subcategories. This perspective enables use of convergence-theoretic tools in quests related to quotient and perfect maps, considerably simplifying the traditional approach. Similar techniques would be unconceivable in the framework of topologies.

Introduction

This paper is designed for a broad mathematical audience. Its purpose is to show the utility of the convergence theory approach to classical themes of general topology. Therefore, I focus on convergence-theoretic methods rather than on detailed applications. For this reason, I shall provide only a small number of examples, referring for more details to classical books on general topology, for example, to [16] of R. Engelking, and to research papers cited below.

It will be shown that the arguments deployed would be impossible without a broader framework transcending that of topologies.

Continuity of maps between topological spaces can be characterized in many ways, in particular, in terms of adherences of filters from various classes, their images, and preimages.

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