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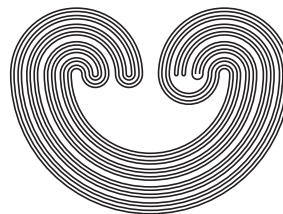
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## THE RATIONAL SEQUENCE TOPOLOGY IS PARTIALLY METRIZABLE

by

SAMER ASSAF AND TOM CUCHTA

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## THE RATIONAL SEQUENCE TOPOLOGY IS PARTIALLY METRIZABLE

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**ABSTRACT.** In this paper, the rational sequence topology is shown to be partially metrizable. This shows that, contrary to a previously stated conjecture, it is possible to have a non-metrizable Tychonoff partial metric space. Furthermore, new conjectures pertaining to the topological structure of partial metric spaces and their possible metrizability are stated.

### 1. Introduction

Partial metrics were initiated in [10] to study topics in computer science such as simply typed lambda calculus [13], program semantics [4], and fuzzy numbers [6]. In general, few topological properties are known for arbitrary partial metric spaces. Fixed point theorems have been extensively studied from a partial metric perspective; see [2], [7], [8], [9], [16], and the references therein. Recent work [1], [3], [5], [11] has focused on the topological nature of partial metric spaces, including separation axioms, continuity, completeness, and compactness.

John E. Porter [14] asks at what strength a separation axiom might force a partial metric space to be metrizable and conjectures that all Hausdorff partial metric spaces are metrizable. By partially metrizing the well-known half-disc topology in [1], a completely Hausdorff non-metrizable space, it is shown that this is not the case. As a result, a new conjecture is stipulated that all regular Hausdorff ( $T_3$ ) partial metric spaces are metrizable. We will demonstrate to the contrary by partially metrizing

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