

## **Nadler's Fixed Point Theorem on Partial Metric Spaces and its Application to a Homotopy Result**

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**Abstract :** In 1994, Matthews (S.G. Matthews, Partial metric topology, in: Proc. 8th Summer Conference on General Topology and Applications, in: Ann. New York Acad. Sci., vol. 728, 1994, pp. 183-197) introduced the concept of a partial metric as a part of the study of denotational semantics of data flow networks. He gave a modified version of the Banach contraction principle, more suitable in this context. In fact, (complete) partial metric spaces constitute a suitable framework to model several distinguished examples of the theory of computation and also to model metric spaces via domain theory. In this paper, we introduce the concept of almost partial Hausdorff metric. We prove a fixed point theorem for multi-valued mappings on partial metric space using the concept of almost partial Hausdorff metric and prove an analogous to the well-known Nadler's fixed point theorem. In the sequel, we derive a homotopy result as an application of our main result.

**Keywords :** fixed point, partial metric space, homotopy, physical sciences

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