Koushik Pal* (koushik.pal@usask.ca) and Samer Assaf (samerassaf@hotmail.com). Partial metric spaces with negative distances and fixed point theorems. Preliminary report.

Metric spaces have been studied by mathematicians for ages. Their importance in several areas of mathematics cannot be overemphasized. About two decades ago, Steve Matthews introduced a major generalization of metric spaces, where the distance between a point $x$ and itself, called the self distance of $x$, is not necessarily zero. He called them partial metric spaces. He went on further to prove an analogue of the Banach Fixed Point Theorem for such spaces. Very recently, we have introduced a major generalization of partial metric spaces, where we not only allow for nonzero self distances, but also allow for “negative distances”. We call such spaces generalized partial metric spaces. Such metrics have a strong connection with “scoring functions” in biology. In this talk, we will start with a motivation for using negative values. Then we will present a generalization of the partial metric fixed point theorem in this generalized context, which is a generalization in several ways. And finally, we will also present a further generalization of metric spaces, called the strong partial metric spaces, which are much nicer than partial metric spaces at least as far as some of the fixed point theorems are concerned. (Received August 27, 2014)