1116-53-868   **Lina Wu*** (`lwu@bmcc.cuny.edu`), 529 West 42nd Street, Apt. 5K, New York, NY 10036, and **Ye Li**. *Discovering Geometric and Topological and Physical Properties by Analytic Curvatures Properties on Convex Hyper-Surfaces from Spheres and Ellipsoids as A Starting Point.* Preliminary report.

Our aim is to find a way to study geometric, topological, and physical properties from the analytic curvature properties for a convex hyper-surface in the general setting. We begin with studying an ellipsoid and a sphere as a starting point. Calculating curvatures of a surface is at the threshold of a better understanding regarding geometric, topological, and physical properties on a surface. In order to calculate various curvatures, we demonstrate the way to compute the second fundamental form associated with curvatures by extending the calculation method from a sphere to an ellipsoid. Just as curvatures of a sphere are determined by its radius, curvatures of an ellipsoid are determined by its longest axis and its shortest axis. On an ellipsoid, the value of the ratio of its longest axis to its shortest axis is also a critical index to characterize its geometric, topological, and physical behaviors. Our results on an ellipsoid are extensions or generalizations of mathematicians' results on a sphere. Methods and research findings from the point of view on an ellipsoid in this paper can provide a clue to the future research on a convex hyper-surface. (Received September 14, 2015)