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Matthew G Wheeler* (maw148@pitt.edu), Department of Mathematics, University of Pittsburgh, 301 Thackeray Hall, Pittsburgh, PA 15260. *Rational structures and their Differential Refinements*. Preliminary report.

In geometry, topology and physics, there is a collection of geometric structures that arise out of the Whitehead tower over BO , which can be ascribed to vector bundles. These include structures such as Spin, String, and Fivebrane. The notion of rational structures will be introduced, which provides a coarser type of structure. These are useful in relating higher geometric structures with an induced Spin structure, allowing us to use techniques such as Chern-Weil and Chern-Simons forms to make the differential geometric qualities of these structures more accessible. (Received September 21, 2015)