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Adam V Lewicki* (adlewicki@davidson.edu), PO Box 6245, Davidson College, Davidson, NC 28035, and **Robert Whitton**. *Well Behaved Rotation About Planar Non-linear Curves: An analysis of the volume and uniqueness of a solid swept out by rotation about a non-linear axis*. Preliminary report.

Pappus' Theorem sweeps a fixed plane about a curve in space, this curve is commonly considered to be the Cartesian axis. We extend this theorem to sweep a "well behaved" curve about a non-Cartesian (non-linear) curve. This "well behaved" curve creates a unique but varying plane at every section of the rotation. We conjecture that if a rotation about a curve is unique and one-to-one at every point in the rotation, and exists in a tubular neighborhood of a given planar axis of rotation, there is a standard and analytical method of calculating the volume swept out in the rotation. We also offer conditions on a curve to guarantee that there exists a bijection from the axis of rotation to the curve to be rotated, and that it lies within a given proper tubular neighborhood of the given non-linear axis. To motivate this idea, we offer a novel example of a torus generated by rotating one circle about another circle in the same plane, with a shared center, but distinct radii. (Received September 22, 2009)