1135-22-415   **Bob Palais*** (`bob.palais@uvu.edu`), 800 W University Parkway, Orem, UT 84058.
Computational advantages and historical insights from viewing quaternion multiplication as geodesic vector addition on S^2.

We will develop geodesic vector addition on the ordinary two-sphere, S^2, a group operation isomorphic to unit quaternion multiplication. This description offers insight into algorithms that implement and interpolate rotations, the belt, plate, and tangle tricks from physics, and several constructions from Lie groups. We will use this geometric perspective to understand the algebraic structure of the product and the mathematical inevitability of its discovery in Rodrigues' 1840 paper on $SO(3)$ as a continuous group. (Received September 01, 2017)

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