1067-Z1-519 **Jason M Osborne*** (jason.osborne@olin.edu), Olin Way, Needham, MA 12492-1200. *A Geodesic- And Parallel-Transport Based, Mass-Spring-Damper Error System On The Euclidean Sphere.*

Using the intrinsic differential geometry of the Euclidean sphere $\mathbb{S}^2$, a control design based on the geodesic–spring paradigm for tracking on $\mathbb{S}^2$ is realized and simulated. At the heart of this design is (1) a generalized Hookean potential whose differential is a force vector with strength and direction defined in terms of the great circles (geodesics) on the sphere $\mathbb{S}^2$, and (2) a generalized damping force defined in terms of parallel transport along the great circles. The geodesic spring design is not original to this work. In general, this control design requires the solution to the geodesic equation as a two–point boundary value problem and the solution to the parallel transport equation as an initial value problem. However, by focusing on $\mathbb{S}^2$, a closed-form expression of the generalized Hookean potential and damping force is obtained and numerical simulations performed. In special cases, closed form solutions to the resulting closed loop equations are also exhibited. (Received September 08, 2010)