

1077-58-89

**Eileen R Martin\*** (emartin@mail.utexas.edu), **Ryan Hotovy** (ryan.hotovy@gmail.com) and **Daniel Freeman** (freeman@math.utexas.edu). *Global coordinate systems on manifolds lacking continuously moving bases*. Preliminary report.

In differential topology, it can be very useful to have a basis for the tangent space of a smooth manifold which varies continuously over the manifold. However, most manifolds do not have a continuously moving bases for their tangent space. In the absence of a moving basis, we propose to study continuously moving finite unit-norm tight frames (FUNTFs). These serve as a useful generalization of bases, and yet they exist on a larger class of manifolds. We investigate properties of manifolds that lead to the existence of FUNTFs and present results related to the minimum number of vectors needed to create FUNTFs on certain classes of manifolds including vector bundles on the circle and the tangent space of  $n$ -spheres. Further, we present a new numerical application of FUNTFs. (Received July 25, 2011)