1100-49-361 **Sanath D Kahagalage*** (sanath-darshana.kahagalage@ttu.edu), 2717 3rd street, Apt 504, lubbock, TX 79415. *Optimal Orientation Control satisfying Listing's and Donders' constraints.*

Human eye and head movements can be looked at, as a rotational dynamics on the space **SO(3)** with constraints that have to do with the axis of rotation. Eye movements satisfy Listing's constraint, wherein the axis vector is restricted to a fixed plane called the Listing's plane. On the other hand, head movements satisfy Donders' constraint, wherein the axis vector, after a suitable scaling, is assumed to lie in a surface called Donders' surface. Various descriptions of the Donders' surface are in the literature and in this talk we assume that the surface originates from the Fick gimbals. Rigid body dynamics is described on the space constrained by Listing's and Donders' laws. Assuming boundary values on the states, optimal movement trajectories are constructed where the goal is to transfer the state between an initial to a final value while minimizing a quadratic cost function on the energy of the, externally applied, control torques. (Received February 10, 2014)