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Bijoy K Ghosh* (bijoy.ghosh@ttu.edu), Mathematics and Statistics Dept., University and Broadway, Texas Tech University, Lubbock, TX 79409-1042. *Optimal Control Problems in Eye and Head Movement Control.*

In this talk, we introduce optimal control problems that can be directly applied to controlling the rotational motion of eye and head. We model eye and head as a sphere rotating about its center, where the axes of rotation is physiologically constrained, as was proposed originally by Listing and Donders. The movement dynamics is derived on $SO(3)$ or on a suitable sub manifold of $SO(3)$ after describing a Lagrangian. The associated Euler-Lagrange's equation is written together with externally applied control torque. From the control system, so obtained, we propose a class of optimal control problem that minimizes the norm of the applied external torque. Our proposed control objective is to point towards a stationary point target, also called the regulation problem. (Received February 10, 2014)