In this talk, we discuss feedback stabilization problems for a class of Rotational Dynamical Systems on $SO(3)$ characterized by Tait-Bryan parametrization. This dynamical system is used to describe human head movement from the point of view of stabilizing an equilibrium point of the dynamical system. We propose a damping type control law which minimizes certain type of meaningful cost functionals on the generalized torque input. (Received February 10, 2014)