1046-93-2046 **Dinesh B Ekanayake*** (dinesh.ekanayake@ttu.edu), Department of Mathematics and Statistics, Texas Tech University, Lubbock, TX 79415-1042, and **Ram V Iyer**. *Tracking control of nonlinear systems with uncertainties in the presence of hysteresis and saturation.*

Piezoelectric, magnetostrictive and shape memory alloy actuators are becoming increasingly important in high frequency and high precision applications, such as vibration control and precision positioning. However, due to the presence of nonlinear physical phenomena, including hysteresis and saturation, control of these actuators is extremely challenging at high frequencies. To study this issue, we consider a feedback control of a class of single-input single-output nonlinear systems in the presence of hysteresis with saturation. In the literature, it is assumed that systems undergo hysteresis only in the input channel and that hysteresis does not become saturated. We do not assume these limitations. We consider system of functional differential equations which includes hysteresis operators. We discuss a controller which forces the output of the system to follow a specified trajectory. We desire uniform ultimate boundedness in the presence of exogenous disturbances and uncertainty in the model. Most controllers use inverse compensators to cancel actuator hysteresis nonlinearity. We show that uniform ultimate bounded control can be achieved without an explicit inverse computation. (Received September 16, 2008)