

## ABSTRACT

This work evaluates the performance of a fuzzy controller (Takagi-Sugeno-Kang) that uses wireless technology to connect the inputs and the output of the controller to sensors / actuators, and with the loss of information from these channels, the result of packet loss. PID controllers are typically used in control loops. Thus, the study compares the results obtained with the fuzzy controllers with the results of PID controllers. Moreover, the work aims to study the behavior of this controller implemented in a microprocessor architecture using integer calculations, interpolation with straight line segments for the membership functions of input and singletons in the output membership functions. For this study it was used in a Matlab<sup>®</sup>/Simulink<sup>®</sup>, a fuzzy controller and the application True Time to simulate wireless environment (Developed by the Department of Automatic Control at Lund University). It is based on MATLAB<sup>®</sup>/Simulink<sup>®</sup> and provides all the tools necessary to create a virtual network environment (wired and wireless). When we increase the occupation of the channel we increase the degradation of it. Under this conditions, is rated the behavior of the control system and is evaluated, and actions were proposal to reduce the impact of packet loss in the control system, as well as the impact of variations in the internal characteristics of plant and architecture used in the network. Initially, tests are conducted using the virtual fuzzy controller (Simulink ®) and thereafter, the controller implemented with dsPIC. Finally, a summary of testing and verification of results are presented.

Keywords: Fuzzy. Wireless Sensor Network. True Time.