

ABSTRACT

In spite of developed modern control techniques like fuzzy logic controllers or neural networks controllers, PID controllers constitute an important part at industrial control systems so any improvement in PID design and implementation methodology has a serious potential to be used at industrial engineering applications. At industrial applications the PID controllers are preferred widespread due to its robust characteristics against changes at the system model.

Networked Control Systems (NCS) are defined as the systems in which a feedback control loop is implemented through a network. The networks employed for this task are based on a range of protocols. The data communicated through the network often face network congestions or collisions resulting in the loss of data carrying packets. This can impose a serious problem for the stability of the networked control systems. The controller under consideration is a discrete PID controller and the packets carrying error signals in a succession are considered missing. The plant is a part of an analogue servo-system. Thus, to use an analogue plant in a digital environment a digitization process is included and a networked model of the system is proposed. In the networked model of the servo-system, Ethernet is proposed as a network, so construction of Ethernet packet and reasons for its loss are given. In Simulations, the discrete PID controller and system showed undesirable characteristics, so the controller is tuned using Steepest Descent Gradient Method. To aid the quick functioning of the method, a program in C-language has been developed. The optimized responses with missing error packets are compared and analyzed.