

ABSTRACT

Humans in their daily lives really need water, especially clean water, so that the need for clean water is increasing along with the increase in population. In the provision of clean water in Indonesia, the business entity engaged in this field is PDAM (Regional Water Supply Company). So we need a precise and efficient air distribution system.

*In solving problems with pipes that often leak, a design is needed using a Hardware In The Loop (HIL) system with Linear-Quadratic Regulator control and implementing the Internet Networked Control System (iNCS). Hardware In The Loop (HIL) which is an appropriate system for testing hardware components on a simulator before implementing them in the actual process. By applying the HIL simulation to the piping system by integrating the iNCS communication, it will minimize operational expenses when manufacturing at the real plant. This system uses the MQTT protocol as a communication which presents a small delay so that information or data will be received quickly. The test results in the HIL simulation can be said to be stable because this system has four eigenvalues, namely -0.0058, -0.400, -16.4176, -16.4518 where all eigenvalues are negative and are to the left of the imaginary axis. **Keywords: Hardware In The Loop, HIL, LQR, Piping, iNCS, MQTT.***