

## **pH CONTROL OF A WASTEWATER TREATMENT UNIT USING LabVIEW AND GENETIC ALGORITHM**

*GHANIM M. ALWAN*

Assist. Prof. Dr.

University of Technology, Chemical Engineering Department, Iraq  
ghnm\_mag@yahoo.com

*FAROOQ A. MEHDI*

Assist. Lecturer

University of Technology, Chemical Engineering Department, Iraq  
Farooqahmed721@yahoo.com

*MURTADHA SABAH MURTADHA*

University of Technology, Chemical Engineering Department, Iraq  
Mur7sabah@yahoo.com

**KEYWORDS:** Genetic algorithm, pH, Process control, LabVIEW, Wastewater.

### **ABSTRACT**

LabVIEW technique is the powerful graphical programming language that has its roots in operation, automation control and data recording for the wastewater system with multiple contaminants of heavy metals; Cu, Cr, and Fe from the electroplating process. LabVIEW is a flexible language that contains large number of functions and tools, which enhance the performance of the process. pH of wastewater is the major key of precipitation process which selected as the desired value of the treatment system. The flow rate of chemical reagents (acid and base) can be selected as the effective decision variable. The pH process dynamically behaved as the first order lag system with dead time. Proportional-integral (PI) mode would be proven as the

best scheme for control the fast pH process. Genetic algorithm (GA) was found the suitable stochastic technique for adaptation controller parameters of the unsteady state nonlinear system. PI genetic adaptive controller improves the performance of the process.

### **INTRODUCTION**

Water pollution is a great problem that threat man's life, so water treatment is a very important issue in order to find best solution for this problem, there are many types of water pollution like biological, thermal, heavy metals and other pollution.

Wastewater from metal finishing industries is one of types that contain contaminants such as heavy metals, organic substances, cyanides and suspended solids at levels, which are