# CHAPTER ONE

# INTRODUCTION

## 1.1 General

Control of liquid flow system is a routine requirement in many industrial processes .The control action of chemical and petroleum industries include maintaining the controlled variables. Fuzzy logic control (FLC) can be applied for control of liquid flow and level in such processes .this technique is particularly attractive when the process is nonlinear [1]. Nowadays, the process industries such as petro-chemical industries, paper making and water treatment industries require liquids to be pumped, stored in tanks, and then pumped to another tank. The control of liquid level in tanks and flow between tanks is a basic problem in the process industries. The above mentioned industries are the vital industries where liquid level and flow control are essential. Many times the liquids will be processed by chemical or mixing treatment in the tanks, but always the fluid level in the tanks must be controlled, and the flow between tanks must be regulated. Level and flow control in tanks are the heart of all chemical engineering systems [2].

## 1.2 Problem Statement

The flow control system has nonlinear and time varying behaviors, thus it is difficult to derive and identify an appropriate dynamic model for traditional controllers in addition it is very difficult to get an accurate and linearised mathematical model for such system .

## 1.3 Objectives

The main objectives of this study are to:

- Design flow control system using PID controller.
- Design flow control system using fuzzy logic.
- Compare the results of PID controller and fuzzy logic controller.

## 1.4 Methodology

The aims of this study are to improve flow control system which uses Proportional - integral - derivative controller with fuzzy logic controller. Proportional integral derivative controller and fuzzy controller are designed using MATLAB Tool Box.

The mathematical model of the flow control is driven and simulated. The results of the conventional controller (PID) and that obtained from fuzzy logic are compared.

## 1.5 Layout

This thesis consists of five chapters including this chapter. The contents of each Chapter are outlined as follows: Chapter one introduces an introduction. Chapter two gives about theoretical background conventional and fuzzy system Chapter three presents the system control design of coupled tank system. Chapter four deals the simulation results. Chapter five gives the conclusion and recommendations.