# Design and Development of PID Controller for Boiler Drum Level Control

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## Abstract

In this project, we are supposed to control Drum Level of boiler by using a PID (proportional Integral Derivative) controller. The concept of this process is to control the level of water in a boiler drum and to make sure that the level of water will always follow the range that has been set. This process requires a continuous control. As our requirement is to have continuous control with less error and quick response, we have chosen to use a PID algorithm.

A microcontroller of PIC 18F family, specifically PIC 18F4550 is used as a controller. Along with the controller, some signal conditioning circuitry is required for the interfacing with the process. The level transmitter gives the output in analog current form. We used current to voltage converter to provide the input to the microcontroller. The process and PID controller are interfaced using MODBUS TCP/IP. The final control element is the Variable Frequency Drive. We are manipulating the inflow of water to control the level of boiler drum.

# Design of an Orifice Plate for Water Services

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## Abstract

This project provides information about design of an orifice plate for typical flow rate and differential pressure along with detailed Calculations. Designed orifice plates were installed concentrically in a pipe of 15 mm diameter and water is used as a medium. A differential pressure is recorded by mercury U-tube manometer to calculate practical flow rate from it. The loop is designed according to AGA standard. Mercury U-tube manometer placed below line and its effects were studied. Characterizations such as percentage error, hysteresis losses, repeatability of each orifice plate are carried out. By experimentation, range of flow rate and range of effective β ratio are obtained in order to get better differential pressure along with system limitations.

# Study and Design of Instrumentation for Improving Distillation Rate

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## Abstract

Most of the processes in chemical industry are involved in purifying components. As a consequence, a large part of the energy use in many industrial sectors can be attributed to separation processes. Distillation is the dominant separation technology in chemical industries despite its huge energy consumption. Distillation consumes about 3% of the total energy consumed globally which is equivalent to 2,871.018 J/hr. Since many separation tasks need to continue with this technology, methods to determine the minimal energy used in a given distillation task have become important.

The objectives of this project are to understand the working of distillation apparatus, level control and increase the productivity of the proposed system. We have performed experiments on the existing system and from that we observed it has some drawbacks such as no automatic level control an did takes more time to get distilled water. So we have introduced a level control loop in the Distillation apparatus. A two wire system is used to control the level. Thus Heater will be OFF if extremely low level is reached. Hence saving the heater from any damage and also saving electricity. Moreover, the recent rise in energy prices and demands further emphasizes the relevance of this problem.

# Pedal Power Generation

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## Abstract

India is the second most country in the world in terms of population & economy. For development of any nation, there is a need of growth in industrial area. For any industry to run, electricity is necessary. Such Electricity is produced with the help of energy sources like coal, natural gas, etc. These energy sources are non-renewable in nature. The supplies of these energy sources are limited in nature & will get exhausted in future if used intensively. Like many countries, our nation is also facing problem of electricity generation. Further increase in the population rate increases the demand of the electricity. So, there is a time come, where it is better to move towards a renewable energy sources like solar, wind, etc. India is the nation of villages. We have the second rank in the economy, but still some rural areas in our country are not developed properly, rather they are still un-electrified. So, there is a need of electricity in such places. In villages, the main mode of transportation is a bicycle. So, it can be seen as a source of energy can be used for power generation. It is also an environment friendly and economical in nature. Electricity can be generated by pedaling the bicycle converting the mechanical energy into electrical one with the help of generator. Nowadays peoples are more health conscious so they spend much of time for exercising in gym. During exercise lots human energy is wasted. It is possible to utilize this energy for power generation with the help of pedaling system. Pedaling system is nothing but exercise cycle which easily place in gym.

A DC stepper motor is used as a generator to produce electricity. A rectifier circuit is used to convert AC voltage produced by stepper motor into DC one. A battery is used as a storage device. It is a 12V lithium-ion rechargeable battery. An inverter circuit is used to convert DC quantity into AC quantity and is used for running any real time application.

# Study and Design of Clinical Water Bath

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## Abstract

Clinical water bath is used in laboratories for testing storing the samples at desired temperature. The first objective of this project is to design and study the water bath, the second being controlling and maintaining the temperature of water inside it. Negative temperature coefficient (NTC) thermistor is used as sensing element that will provide the necessary information of the process variable. ON/OFF control strategy is applied to control the temperature in the water bath as we required maintaining the specific temperature. Relay acts as the ON/OFF controller and heater is the final control element (FCE). Motor is used to rotate the stirrer for maintaining the temperature uniformity. Heater is automatically operated by relay according to our desired temperature set point.

# Water Level Control Using PLC

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## Abstract

Automatic level control is the project that has been proposed to replace existing system this project is to control water level in upper tank whether it is low level or high level when sensor detect the water level the water pump will act as a controller by system, which we called controller. Automatic water level controller for both overhead and underground tank is designed to monitor the level of water in a tank. It displays the level of water and when it is at the lowest level, a pump is activated automatically refill the tank. When the tank is filled to its maximum capacity, the pump is automatically de-energized. In today's life the study of Programmable Logic Controller (PLC) becomes one of the most important thing in all field .Programmable logic controller were developed to provide a replacement for large relay based control panel. These systems were inflexible major rewriting or replacement whenever the control sequence was to be changed. The purpose of using this PLC is to control the water's level in tank and when it come to the set point of desired level it will automatically stop or on the pump and also it will give a signal to user so that the user know either the pump is on or off and level of water. So as the input of the PLC we need the sensor to determine the level of the water in tank empty, half empty or full. When it comes to the set point the pump will ON or OFF.