

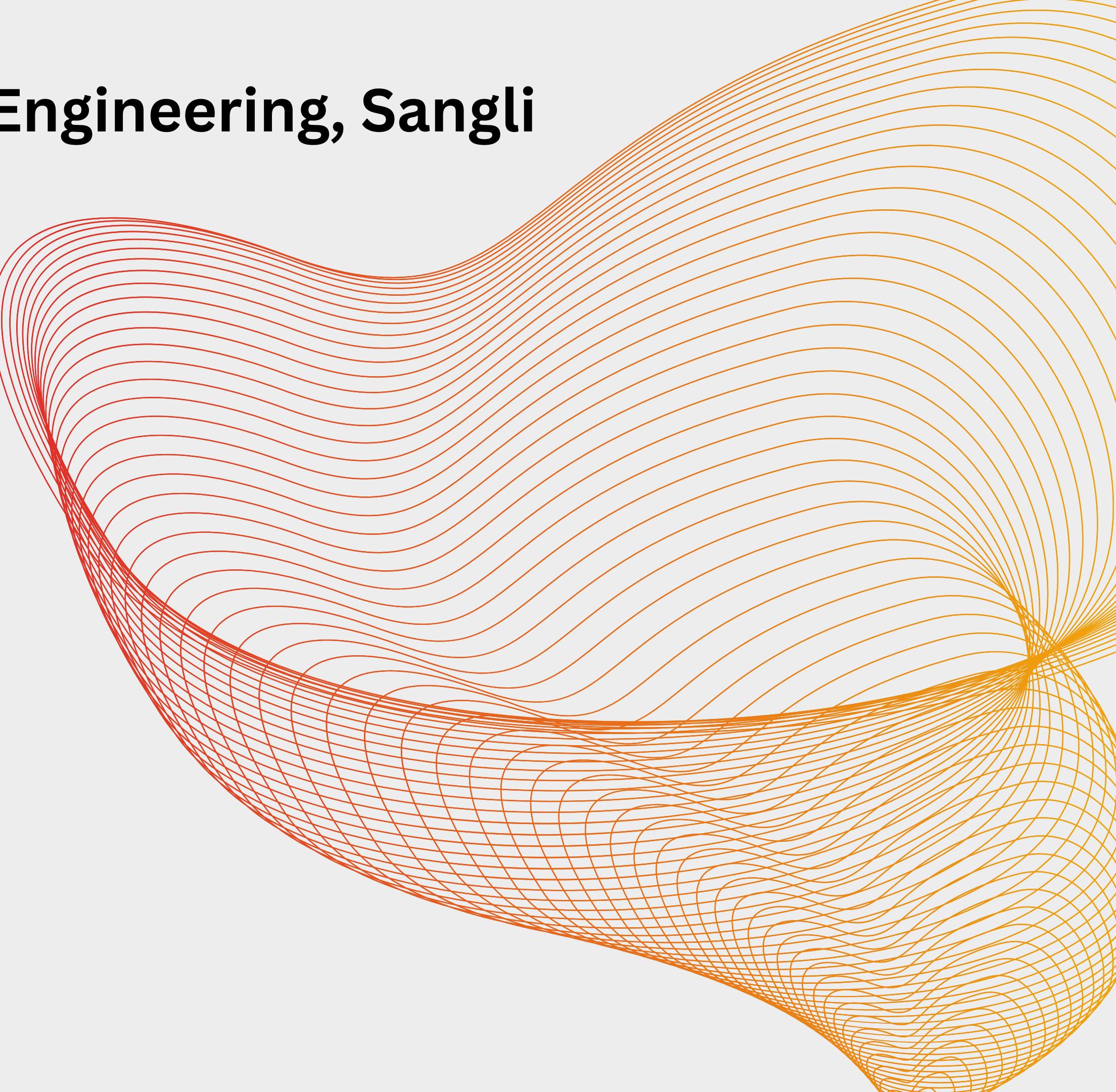


Walchand College of Engineering, Sangli

Speed Control of DC motor using PWM

Course: Microcontroller and
Peripheral Interfacing

Created by
Group 7

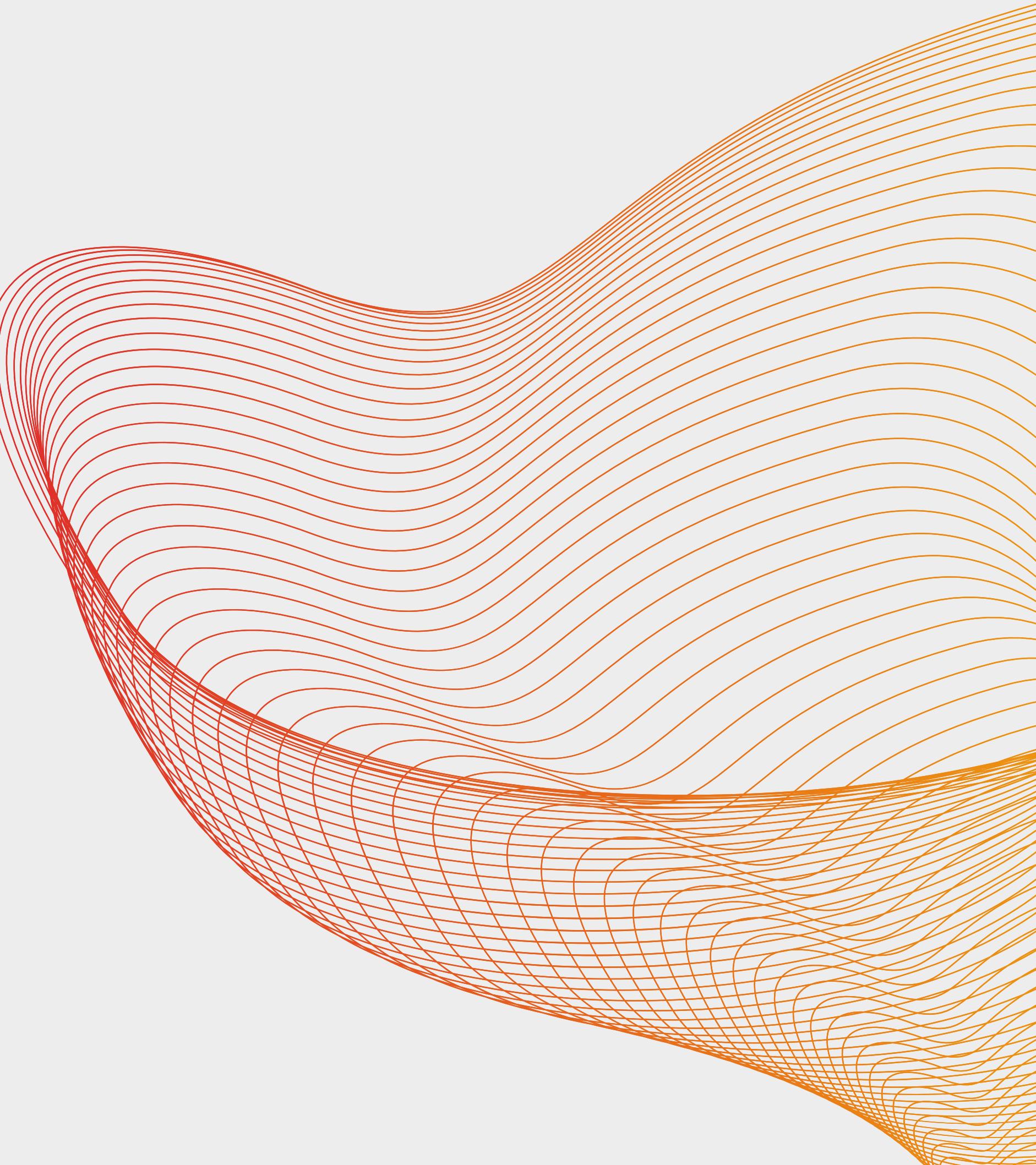




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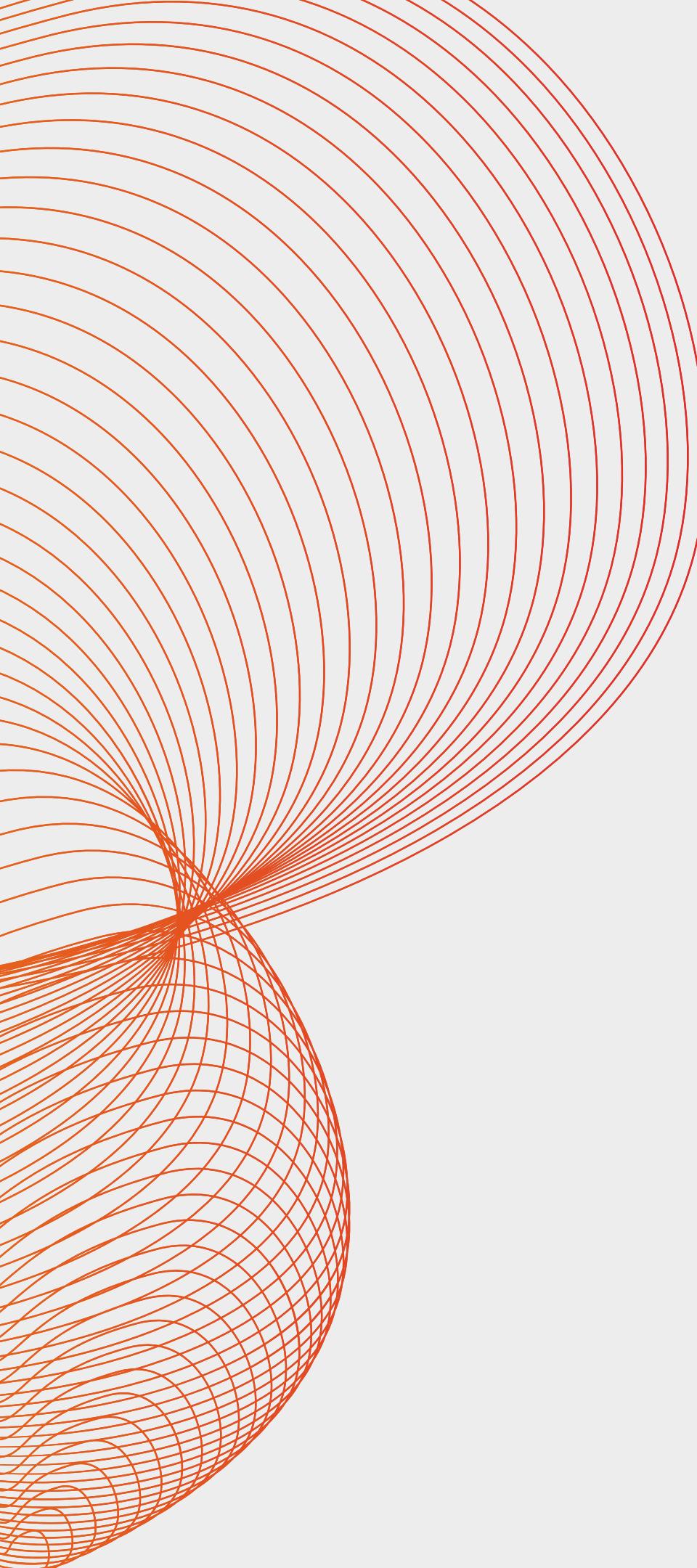
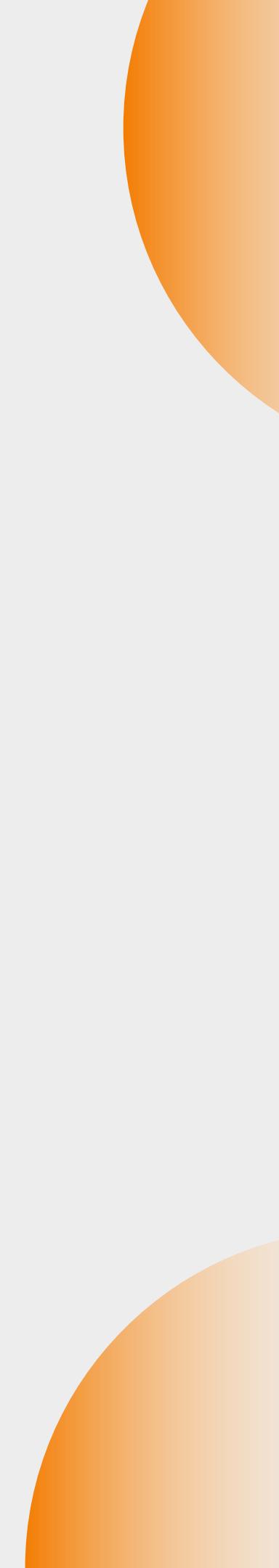


Table of Content



- Introduction
- Objectives
- Components Required
- Circuit Diagram
- Block Diagram
- Algorithm
- Advantages
- Conclusion



Introduction

Aim of developing this project is to control the speed of dc motor. Advantage of dc motor is speed-Torque relation can be varied almost of any required form . To achieve the speed control an electronic technique Called Pulse Width Modulation is used which generate high & low pulses . Microcontroller is used to generate a PWM using a timer interrupt and the duty cycle as per requirement . We are also using L298N motor driver Module which can control upto 4 dc motor 2 with direction control and 2 with speed control.



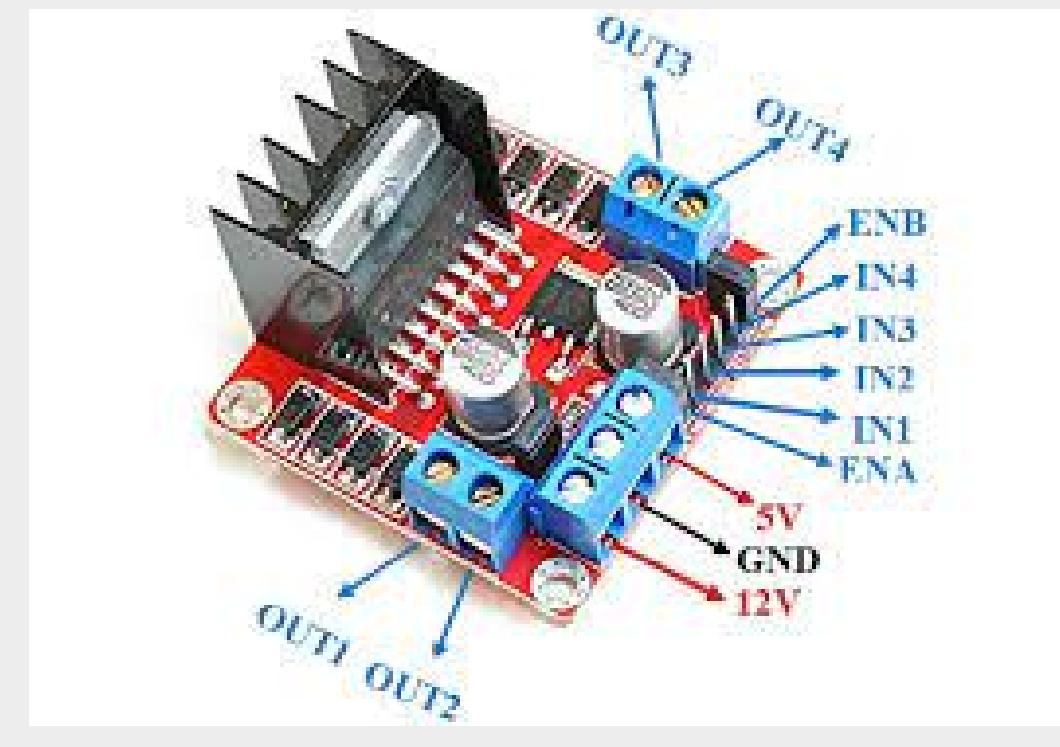
Objectives

- 1. Configure L298n and 8051 microcontroller.**
- 2. Design algorithm to generate PWM for speed control of DC Motor.**
- 3. Design and implement a user interface for speed control of the DC motor.**

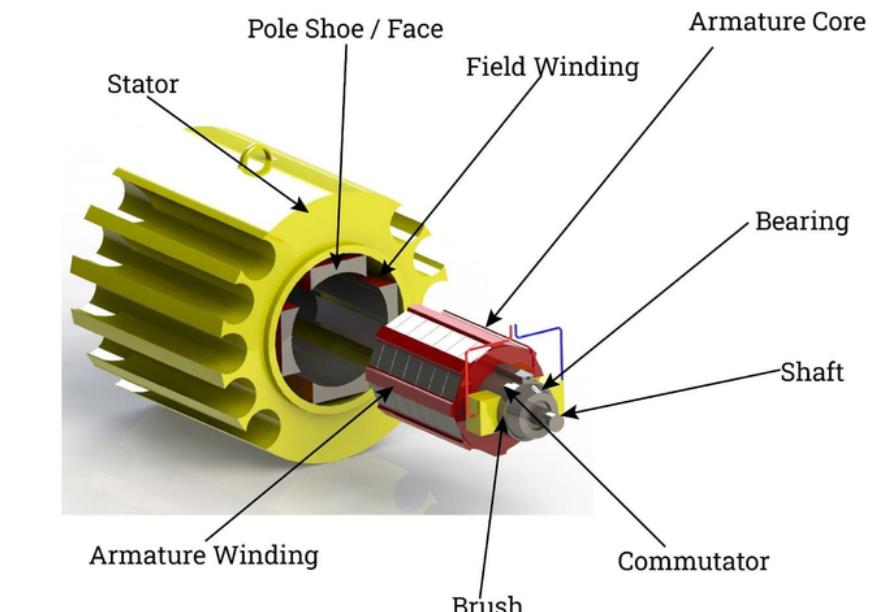


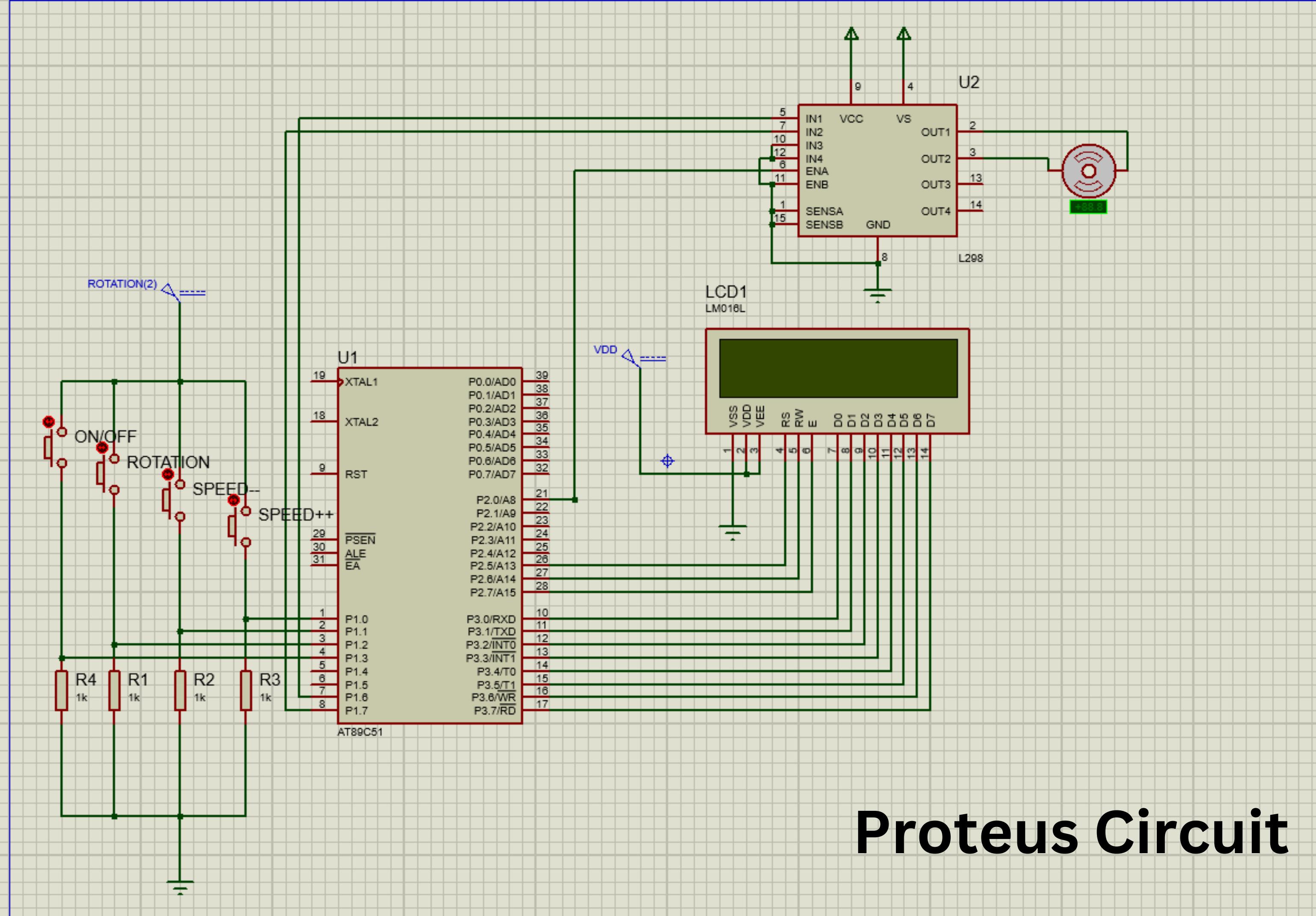
Components

1. Microcontroller-8051
2. DC Motor(12V)
3. L298n Motor Driver
4. LCD 16*2
5. Push buttons



DC Motor Diagram

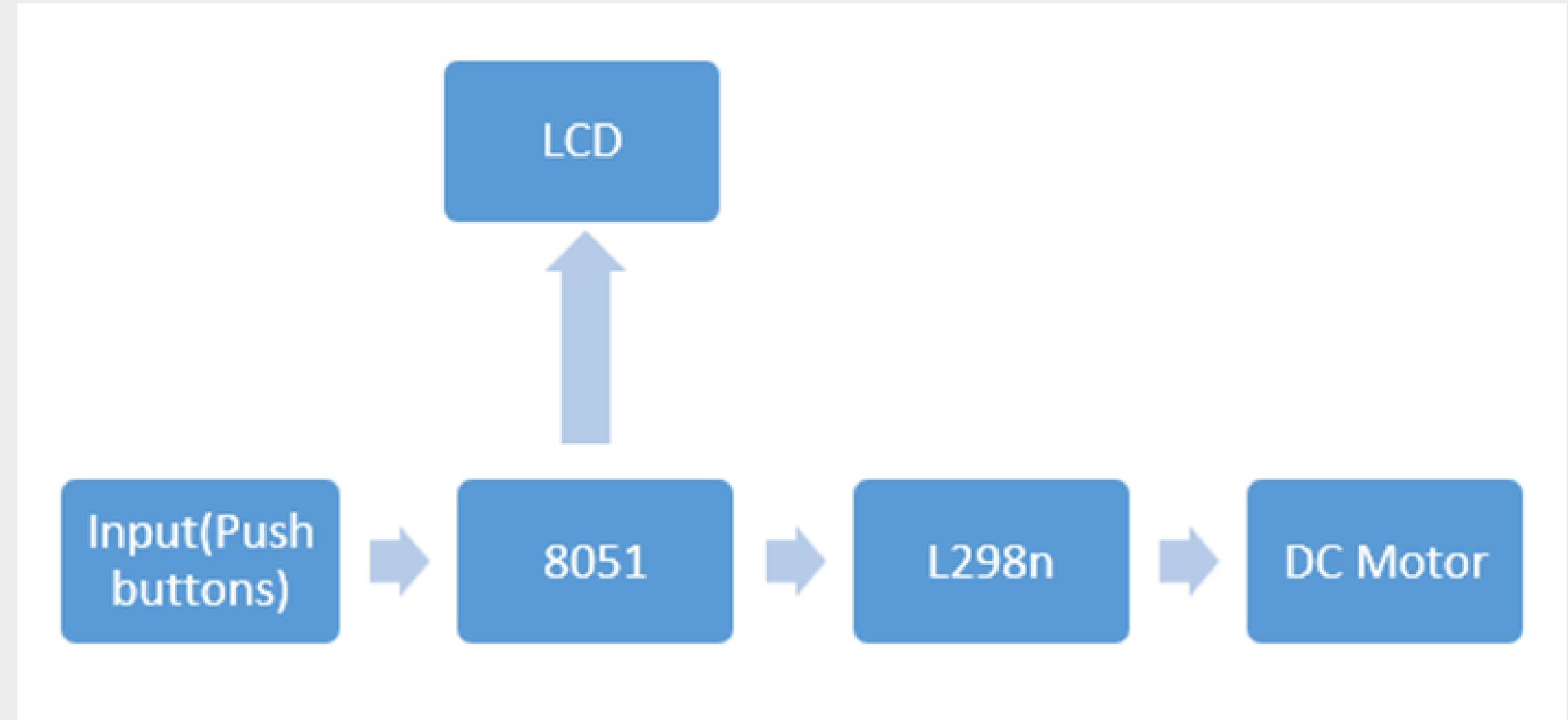




Proteus Circuit



Block Diagram





Algorithm

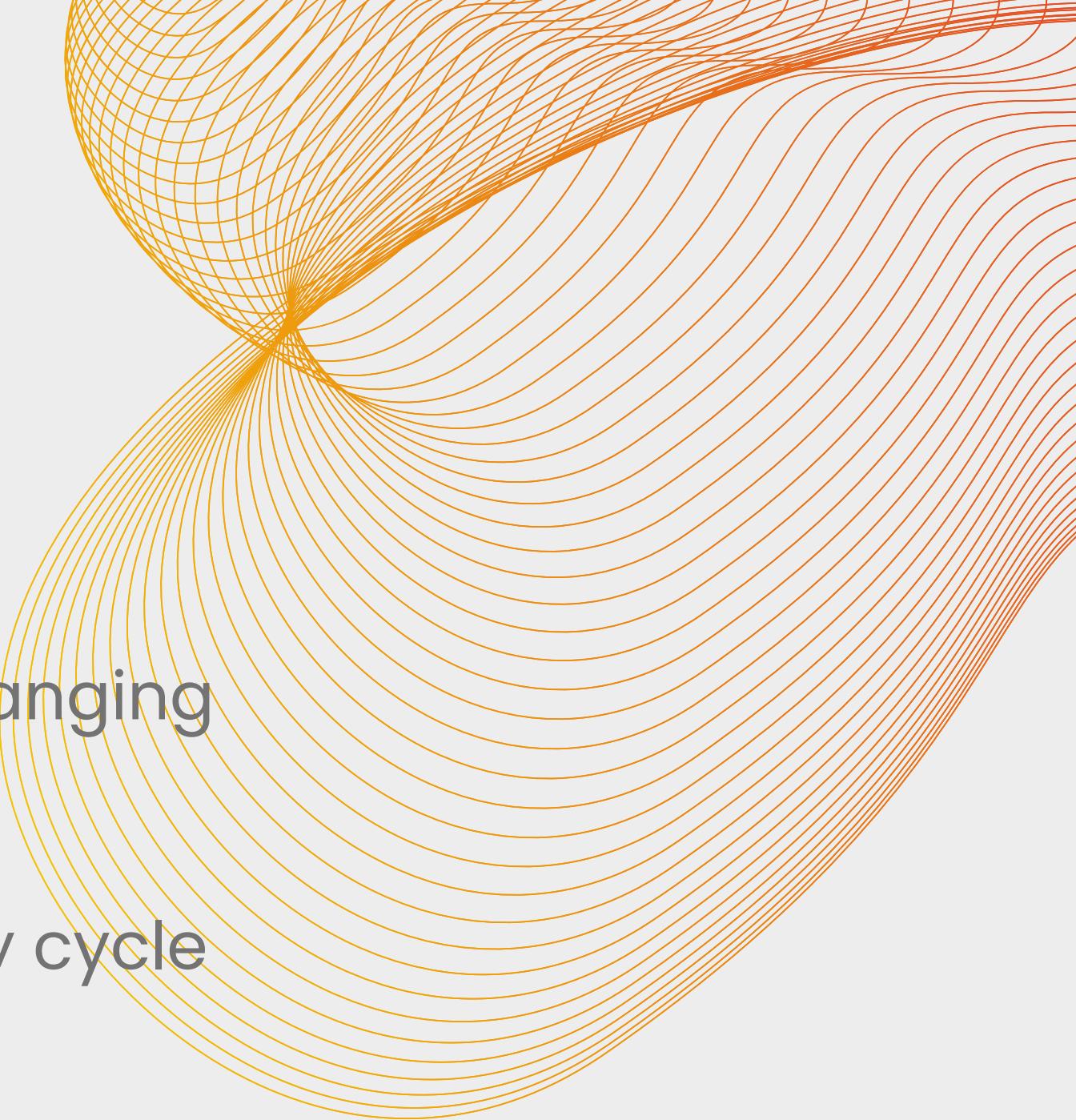
- Configure the timer0 of 8051 in mode 1 for 16-bit timer operation
- Calculate the timer0 reload value for the desired PWM frequency
- Calculate the duty cycle
- Set the duty cycle of the PWM signal
- Connect the PWM output pin of the 8051 to a driver circuit that can control the motor speed based on the PWM signal
- Initialize the timer0 and start it.





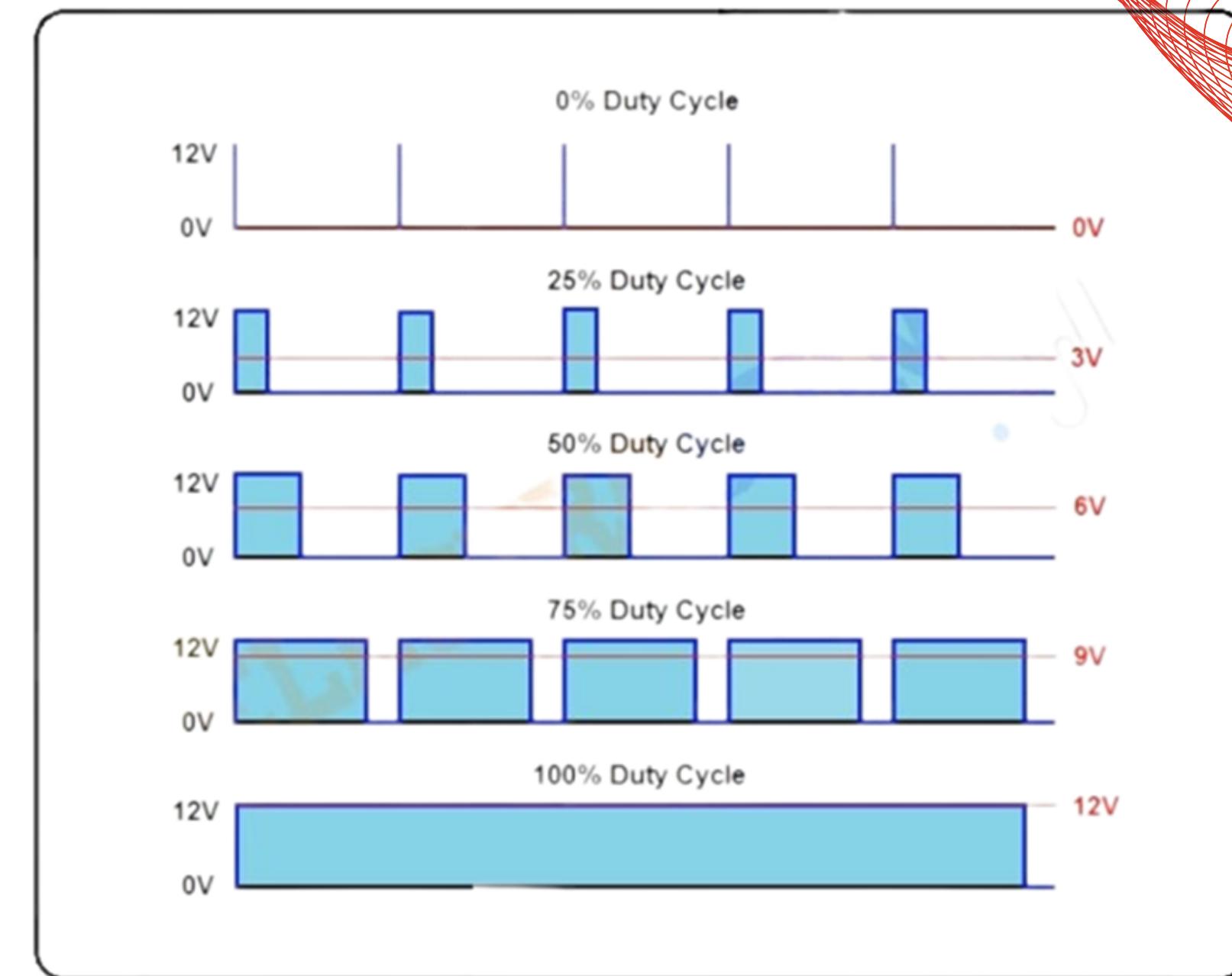
Algorithm

- In a loop, vary the duty cycle of the PWM signal by changing the value
- Delay for a short period between each change in duty cycle to allow the motor to respond to the new PWM signal
- Repeat above steps until the desired motor speed is achieved
- Make motor 0





Why PWM?





Various Technique

1) Analog Control

A variable resistor or a potentiometer to vary the voltage supplied to the motor, which in turn, controls the speed of the motor.

2) Frequency Modulation

The frequency of the voltage supplied to the motor is varied, rather than the duty cycle.



Various Technique

3) PWM(Pulse Width Modulation)

There are two ways to generate pulse width modulation signal using microcontroller :

- 1)Using timers of 8051'
- 2)Switch a particular pin high and low.

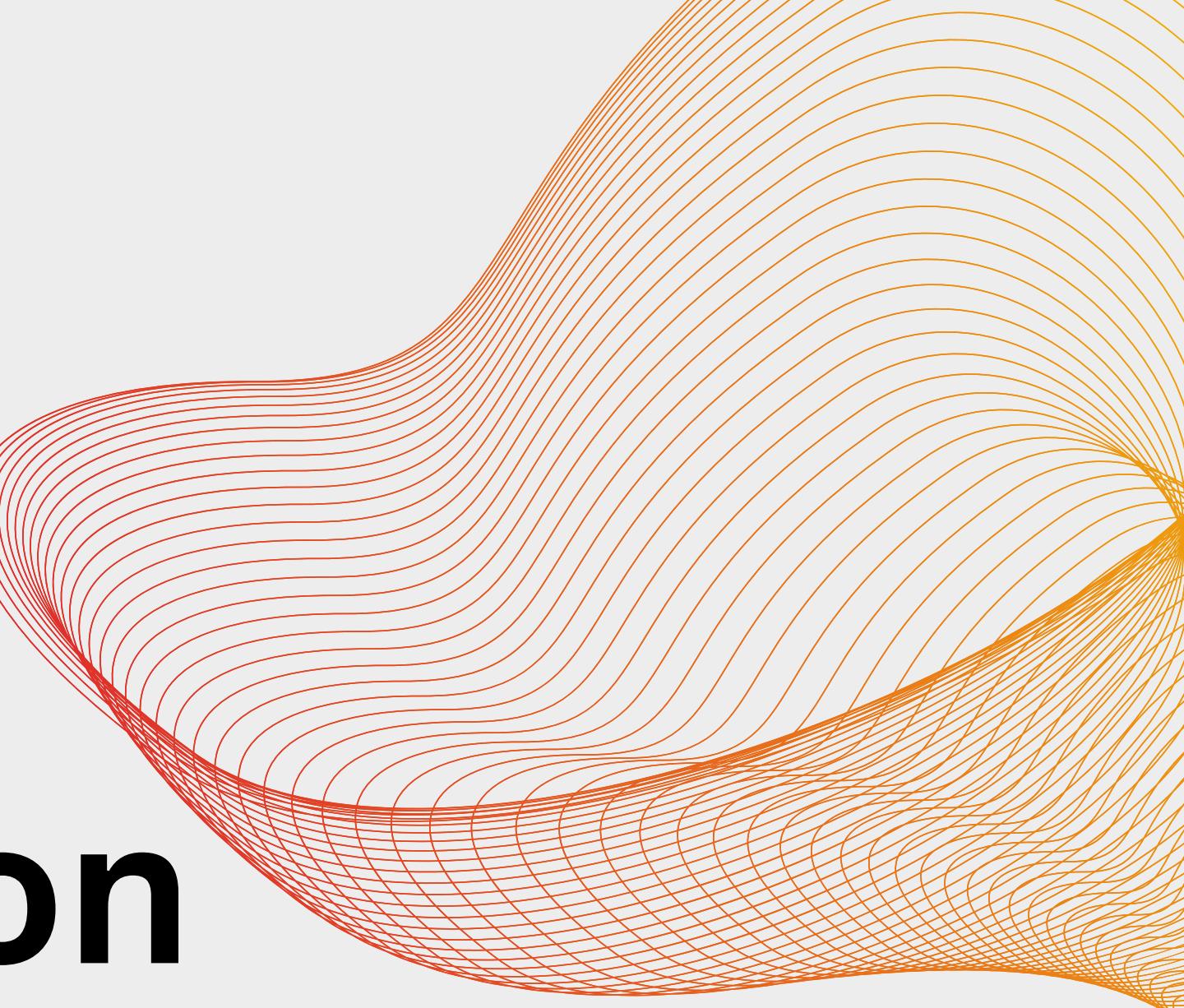


Advantages of PWM

- Efficiency
- Precise Control
- Low Heat Generation
- Easy to Implement
- Compatibility



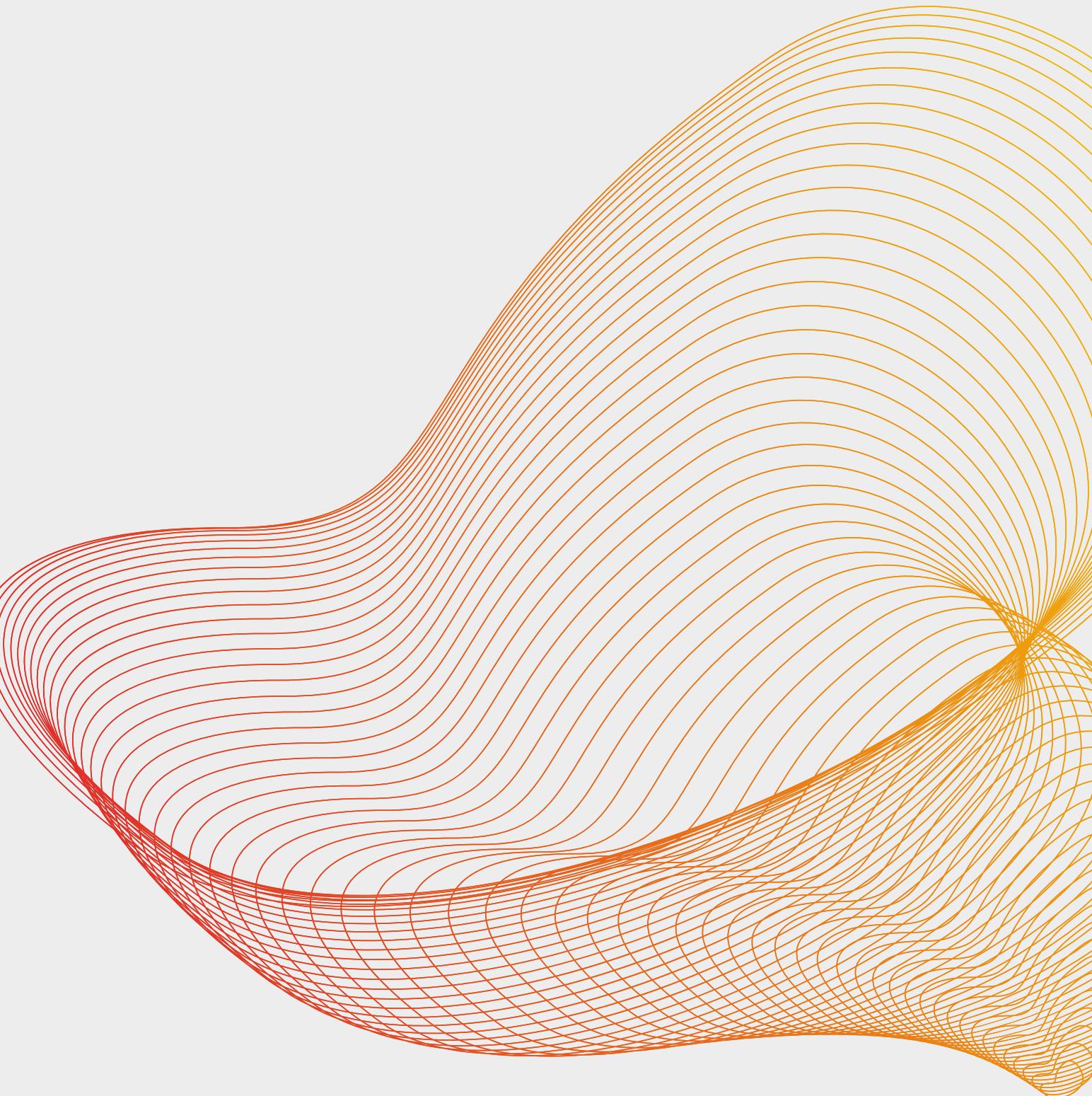
Conclusion





Future Scope:

- i) Remote Control Integration**
- ii) Closed-Loop Control**
- iii) Multi-Motor Control**





Thank You

