EXPERIMENT-2

Unipolar PWM in Simulink

AIM:

The aim of this lab is to learn and apply Unipolar Pulse Width Modulation (PWM) using Simulink. Students will investigate the principles of PWM, its applications, and acquire practical skills in designing and simulating a Unipolar PWM waveform in Simulink.

SOFTWERE AND EQUIPMENTS:

- Computer with MATLAB and Simulink software
- MATLAB Simulink software
- Basic familiarity with MATLAB and Simulink

THEORY:

I. PULSE WIDTH MODULATION:

Pulse Width Modulation (PWM) is a method of encoding information into a signal by varying the widths of pulses. It finds extensive applications in controlling power to electrical devices and transmitting data over communication channels. In PWM, the width of the pulse changes based on the information being encoded. This modulation technique is particularly useful for regulating the speed of motors.

II. UNIPOLAR PWM:

Unipolar PWM is a type of PWM where all pulses have the same polarity. The average value of the signal is determined by the duty cycle of the pulses, which represents the ratio of the pulse width to the total time period. This lab focuses on generating a Unipolar PWM waveform using Simulink, a graphical

programming environment in MATLAB. Through Simulink, users can model and simulate various systems, making it an ideal tool for experimenting with PWM waveforms and their applications.

STEPS:

- **Launch MATLAB and Simulink:**
  - Ensure that MATLAB and Simulink are correctly installed on your computer.
  - Start MATLAB and open Simulink from within the MATLAB environment.

- **Create a New Simulink Model:**
  - Begin by creating a new Simulink model within the Simulink environment.

- **Design Unipolar PWM:**
  - Utilize Simulink blocks such as Pulse Generator, Comparator, and Scope to construct a Unipolar PWM waveform.
  - Connect the blocks appropriately to form the PWM circuit.

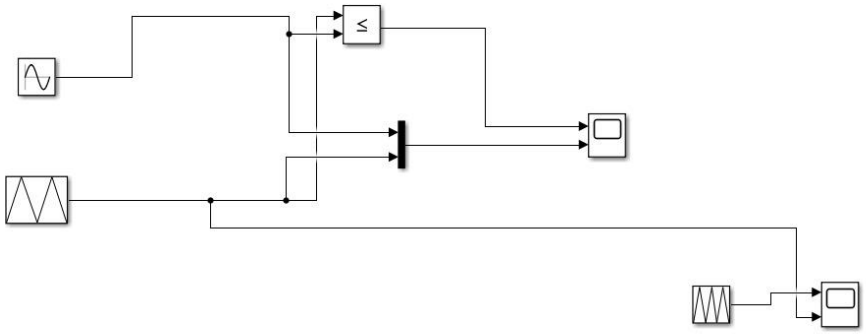
- **Set Parameters:**
  - Adjust the parameters of the blocks to control the frequency and duty cycle of the PWM waveform as desired.

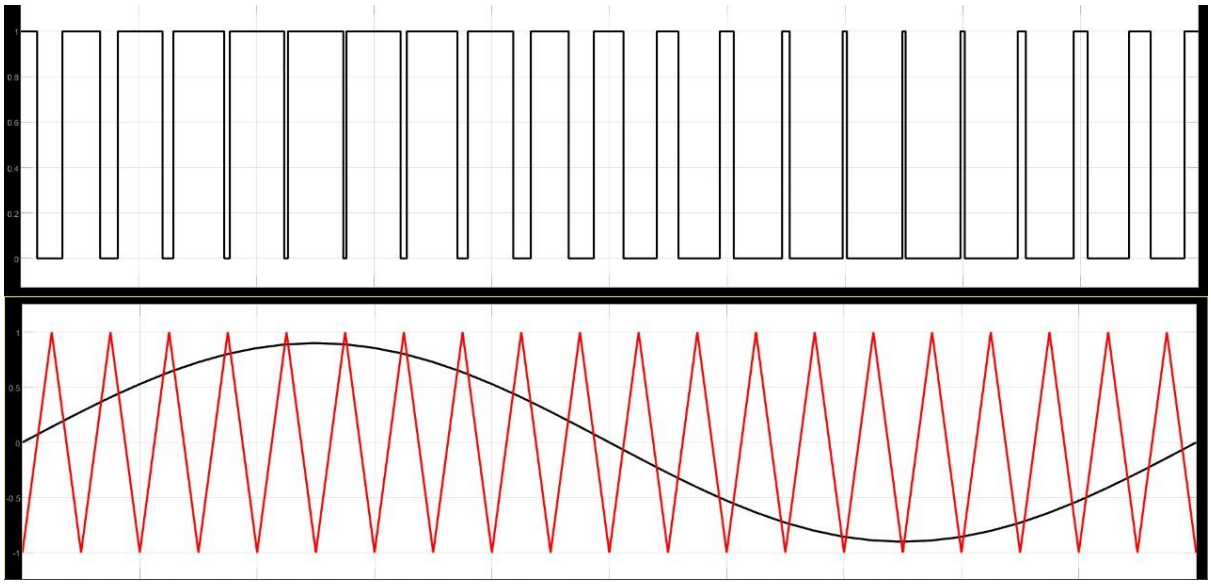
- **Simulate the Model:**
  - Execute the simulation to observe the Unipolar PWM waveform generated by the model.
  - Use the Scope block to visualize and analyze the output waveform.

- **Analyze Results:**
  - Examine the waveform to understand how it changes with variations in the duty cycle.
  - Explore the applications of Unipolar PWM, such as motor speed control and other relevant uses, by observing its characteristics and behavior in the simulation.

RESULTS:

CIRCUIT:





CONCLUSION:

In this lab, I have successfully created and tested a Unipolar PWM waveform using Simulink. PWM is important in many engineering applications, and this lab gives you practical experience in its implementation.