

EE 673, Power Electronics and Power System Laboratory Indian Institute of Technology, Bombay Experiment – 09: V/f Induction Motor Control Handout - Activity

Date- 11/04/2025

Duration: 3 hours

Activity 01 – Write a program to generate 3-phase Sinusoidal Pulse Width Modulation (SPWM) signals, where Phase A is assigned to ePWM1, Phase B to ePWM4, and Phase C to ePWM2. The PWM frequency should be set to 2 kHz, and each phase must include a deadband of 25 microseconds to prevent shoot-through. Use ePWM3 to generate interrupt. Given the ISR frequency is 10Khz. After generating the PWM signals, use RC filters to reconstruct the analog waveforms and verify the 120-degree phase shift between the phases using an oscilloscope.

Activity 02 – Modify the 3-phase SPWM code to implement a frequency ramp. The frequency should gradually increase or decrease in between 10 Hz and 55 Hz. The motor should run at any desired frequency between above range while ensuring the output frequency of SPWM never exceeds 55 Hz. The frequency should change at a rate of 1 Hz per second, which corresponds to an increment or decrement of 0.0001 Hz per ISR call, given the ISR frequency is 10 kHz. Throughout the ramping process, maintain a constant V/f (voltage-to-frequency) ratio to preserve the motor's magnetizing flux.

(Note: - Use flowchart to write the ramp code, f_{inter} = intermediate frequency, f_{target} = target frequency).

Activity 03- Run the analog V/f drive(cx2000) and compare the results.



Fig: Flowchart for Ramp code