

MODELLING AND SIMULATION OF VOLTAGE SOURCE INVERTER FED INDUCTION MOTOR DRIVE.

EX.NO:

DATE:

Aim:

To model and simulate the voltage source inverter fed induction motor drive using PSIM.

Requirements:

Procedure:

Steps to create modeling by using PSIM:

Components	Elements	Block	parameters
DC Source	Elements/Sources /Voltage/DC	DC	Amplitude=500
IGBT	Elements/Power /Switches	IGBT (6 Numbers)	Default
ON-OFF Controllers	Elements/Other /Switch Controllers	On-Off Controllers (6 numbers)	Default
NOT gate	Elements/ Control /Logic Elements	NOT gate (3 numbers)	Default
Comparator	Elements/Control	Comparator (3 numbers)	Default
3 phase Source	Elements/Voltage	3 Phase Sine	V line-line (rms)= 0.9 Frequency= 50
Triangular Source	Elements/Voltage	Triangular	V_peak_to_peak=2 Frequency= 1500
Induction Motor	Elements/ Power/Motor Drive Module	Squirrel Cage Induction motor	Torque Flag = 1 (Remaining parameters default)
Mechanical Load	Elements/ Power /Mechanical Loads and Sensors	Mechanical Load (Constant Torque)	Constant torque = 40
Speed Sensor	Elements/ Power /Mechanical Loads and Sensors	Speed Sensor	Default
AC ammeter	Elements/ others/Probes	AC ammeter	Default
Voltage Probes	Elements/ Probes	Voltage Probes (5 Probes)	Default

1. Click on **File**→ **New**
2. Make/Model the circuit by placing all its Blocks from its corresponding Elements, which is clearly shown in the table 1. Right click on the block to rotate mirror etc. to organize the circuit elements.
3. To change the circuit parameters applicable to the block by double clicking on the block/element and type the values. Keep the values default for some blocks like Squirrel Cage Induction motor, 3 phase sources etc.
4. To measure/observe the voltage across or current passes through the electrical block/device, connect **voltage measurement** or **current measurement** blocks respectively with the electrical block, it is available on the **Elements/ others/Probes**
5. Make the connections as per the **schematic diagram 1**.
6. Set the Amplitude modulation index M_a (Line to line value of 3 phase source block) (Range with in 0 – 1)
7. Vary the torque of the Induction machine (double click on the motor torque block) and run the simulation for 0.75 secs.
8. After 0.75 secs note the speed of the Induction machine and record it in the table 1.
9. Repeat steps 9 and 10 for some 4 values of load torque.
10. Repeat the above steps for various values of M_a .

Steps to simulating the circuit by using MATLAB/SIMULINK:

1. After correcting all floating node errors start by creating a simulation.
2. Click on **simulate**→**Simulation Control** and make sure that Total time as 0.75 and print step to 50.
3. Press F8 to run simulation.
4. To view the simulation plots click **simulate**→ **Run SimVIEW**

TABLE 1: For Modulation Index of (M_a) = _____.

Slno	Speed in RPM	Torque in Nm
1		
2		
3		
4		
5		

TABLE 2: For Modulation Index of $(M_a) = \underline{\hspace{2cm}}$.

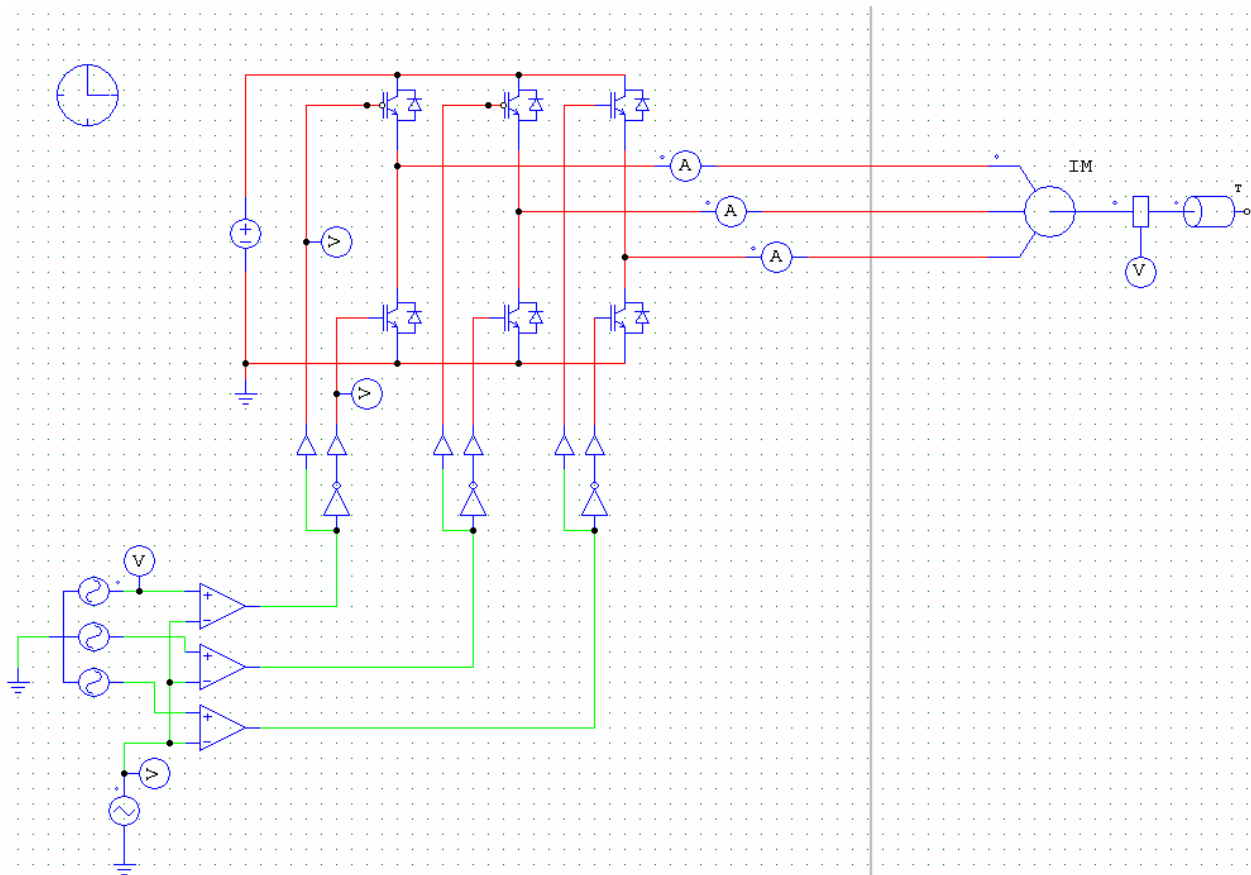
SIno	Speed in RPM	Torque in Nm
1		
2		
3		
4		
5		

Result:

The model of voltage source inverter fed with squirrel cage induction motor is created and simulated by using PSIM and the corresponding waveforms are observed.

SCHEMATIC DIAGRAM: 1

**SINGLE PHASE FULL CONTROLLED BRIDGE RECTIFIER FED WITH DC
SEPERATELY EXCITED MOTOR**



WAVEFORMS FOR MOTOR-LOAD:(Ma = 0.9 Volts)

