Speed control of three phase Induction motor drive using V/*f* control

Aim:

To study the performance of three phase Induction motor drive using V/*f* control

i. To observe the effects speeds produced with the variation of torque,frequency and modulation index in the above mentioned converter using matlab

Tools Required:

Software

: MATLAB/Simulink.

System requirements : Minimum 4 GB RAM, i5 Processor.

Procedure

Construct the Simulink model as per the circuit diagrams shown in various figures. Use pulse generator to trigger the SCRs.

2. Refer to the aim and connect the required measurement units. Use **scope** to view the waveforms of speed and **display** to view the rms and average values.

3. Configure all the components with the corresponding values at 50 Hz.

4. Configure simulation by using **powergui** block, stiff solver and required time.

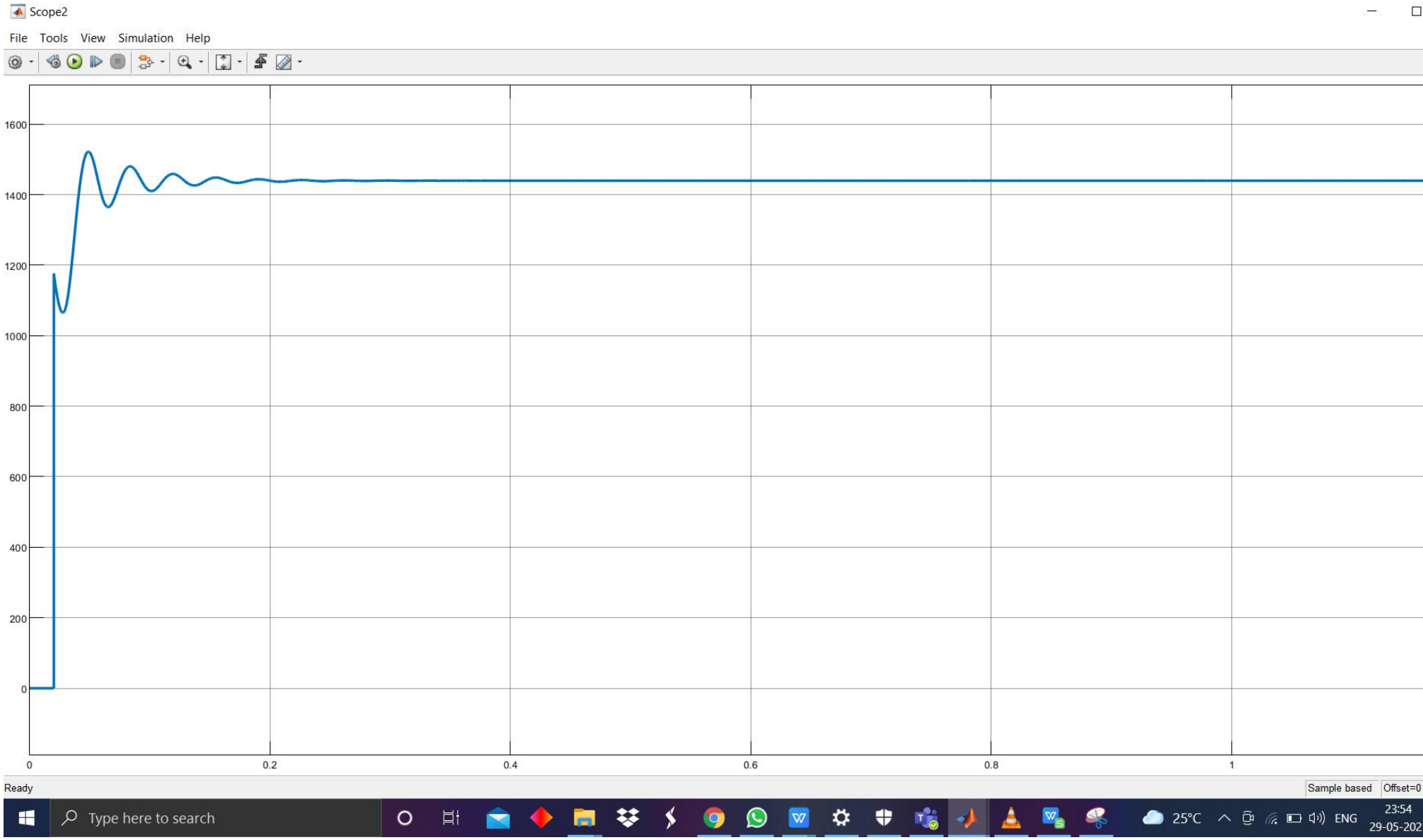
5. Run the simulation and note the waveforms across various elements for a specific value of alpha "α".

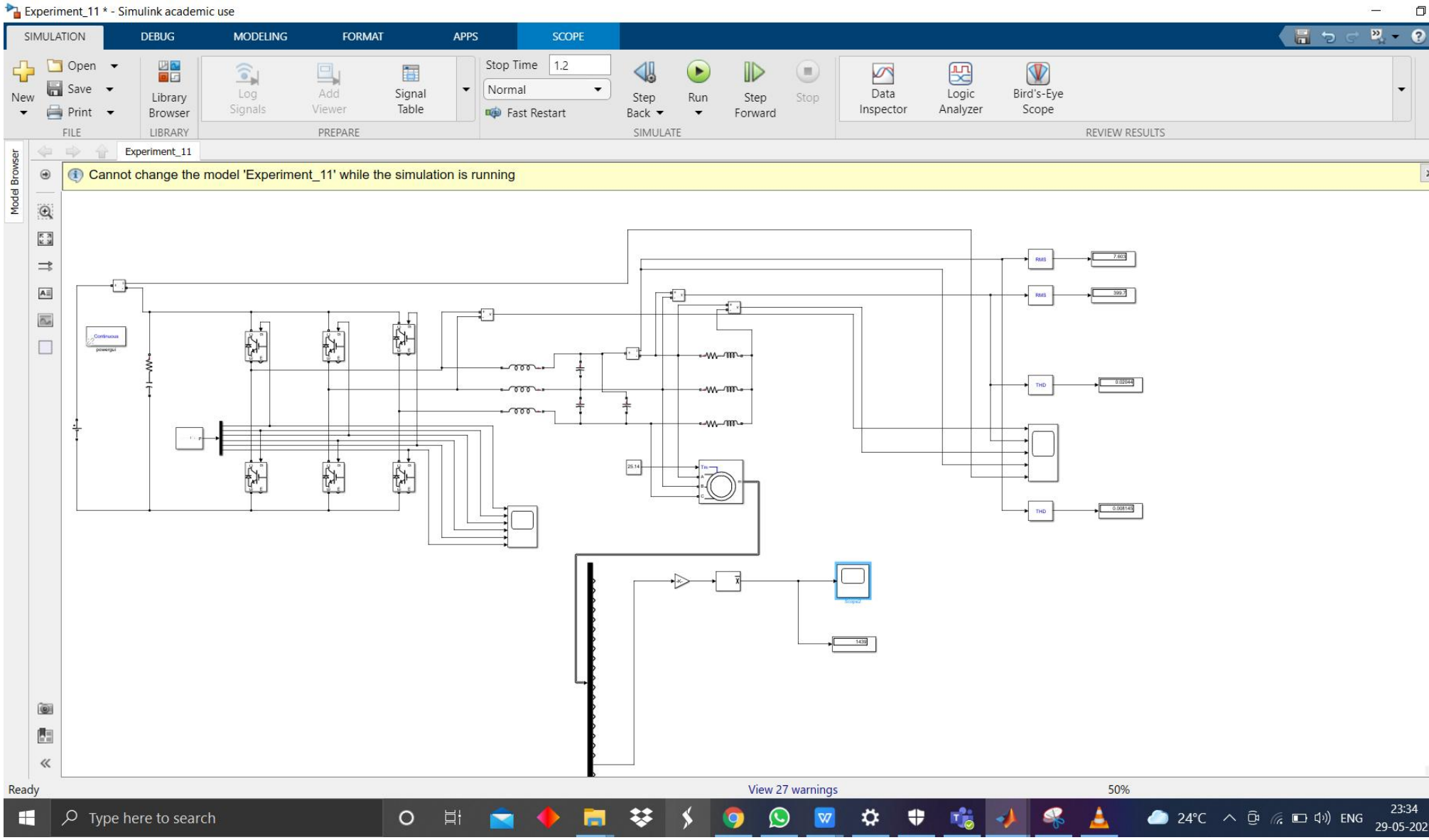
6. Vary the firing angle "α", note the change in speed and tabulate them.

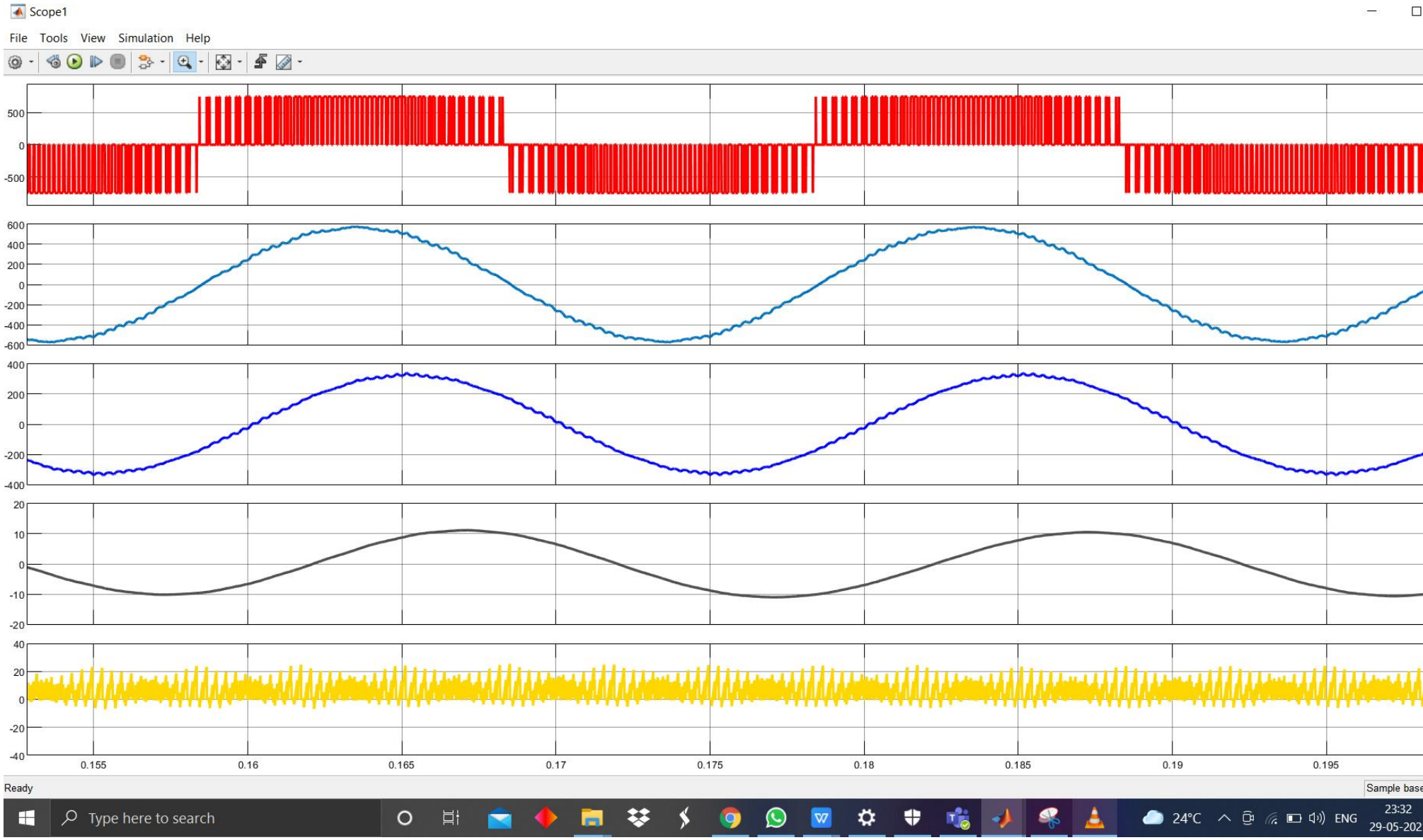
7. Draw the waveforms and graphs

Model

Torque=25.14,Modulation index =0.87


Scope2
File Tools View Simulation Help
1600
1400
1200
1000
800
600
400
200
0
0
0.2
0.4
0.6
0.8
1
Ready
Sample based
Offset=0
Type here to search
25°C
ENG
23:54
29-05-202


Experiment_11 * - Simulink academic use
SIMULATION
DEBUG
MODELING
FORMAT
APPS
SCOPE
New
Open
Save
Print
FILE
Library Browser
LIBRARY
Log Signals
Add Viewer
Signal Table
PREPARE
Stop Time
1.2
Normal
Fast Restart
Step Back
Run
Step Forward
Stop
SIMULATE
Data Inspector
Logic Analyzer
Bird's-Eye Scope
REVIEW RESULTS
Model Browser
Experiment_11
Cannot change the model 'Experiment_11' while the simulation is running
RMS
RMS
THD
THD
Ready
View 27 warnings
50%
Type here to search
24°C
ENG
23:34
29-05-202


Scope1
File Tools View Simulation Help
500
0
-500
600
400
200
0
-200
-400
-600
400
200
0
-200
-400
20
10
0
-10
-20
40
20
0
-20
-40
0.155
0.16
0.165
0.17
0.175
0.18
0.185
0.19
0.195
Ready
Sample base
Type here to search
24°C
ENG
23:32
29-05-202

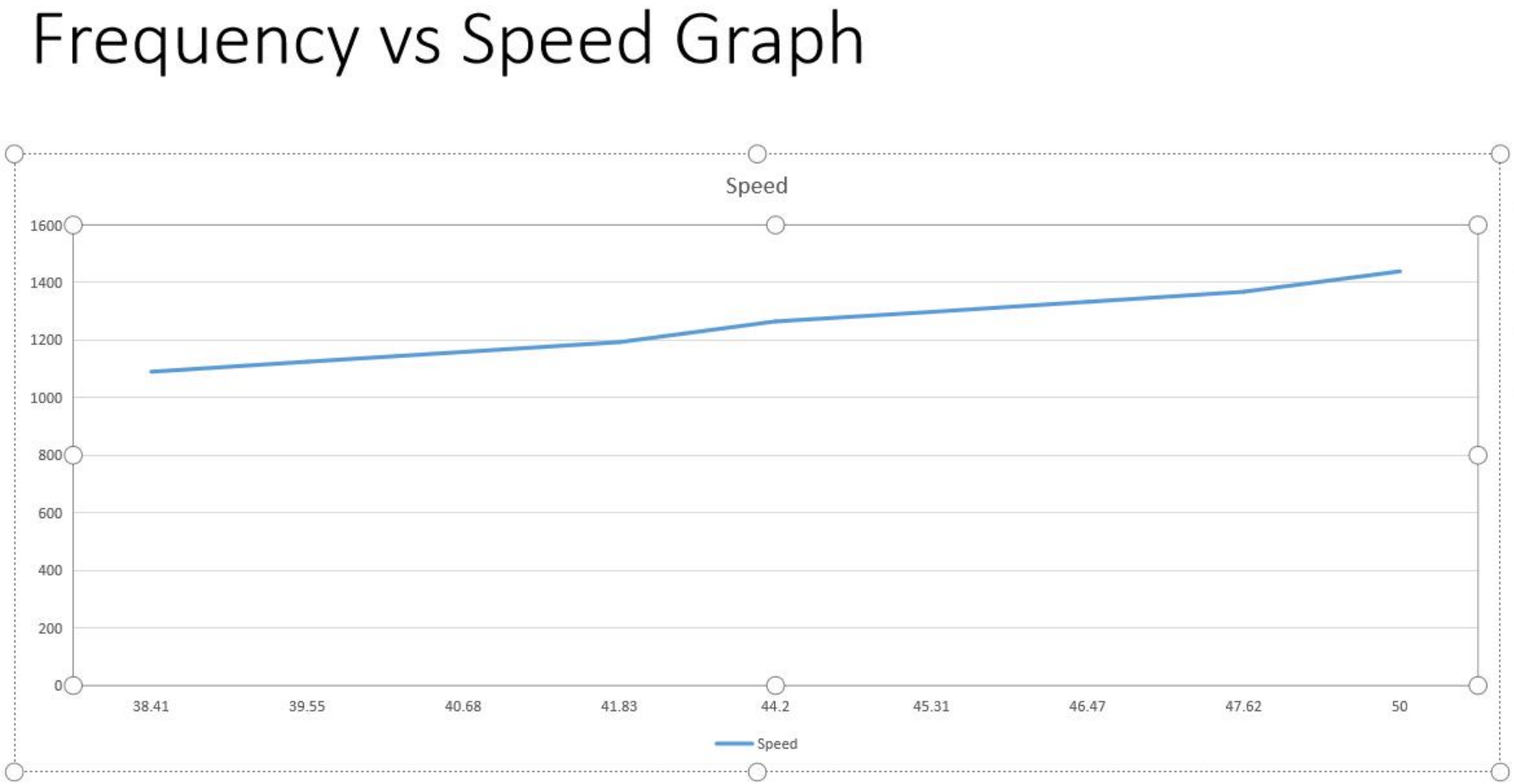
Observations

I)Frequency vs speed

Torque=25.14,V/f=8

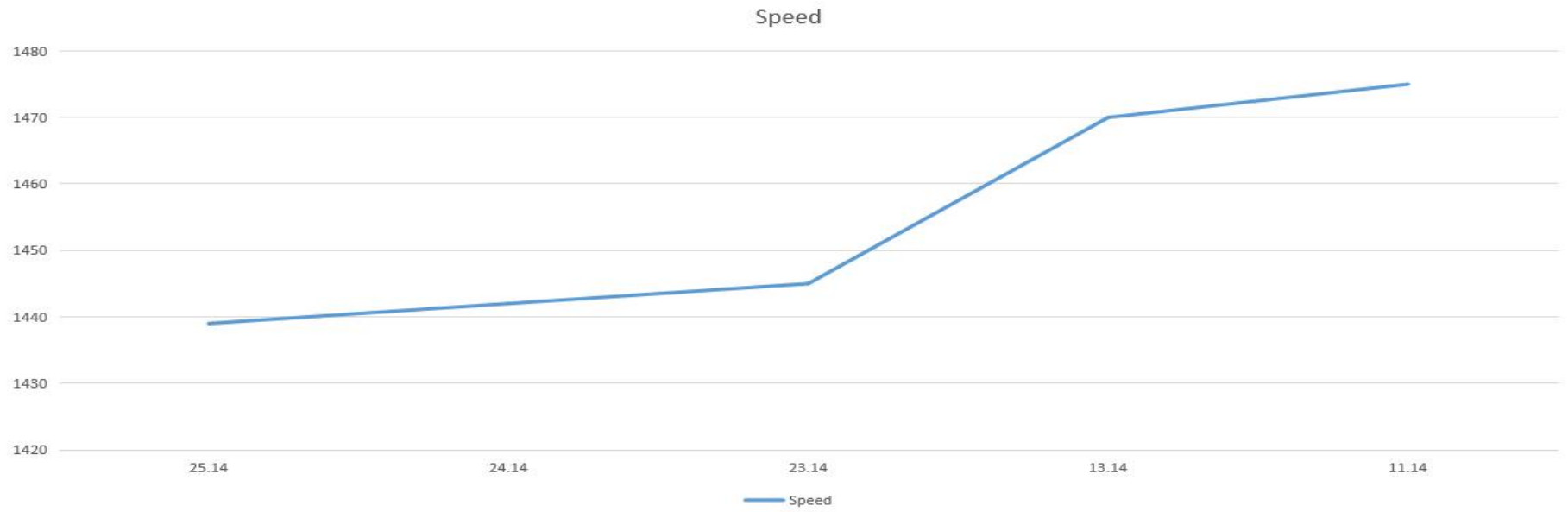
Modulation index	Frequency	Terminal voltage	Speed
0.67	38.41	307.1	1090
0.69	39.55	316.4	1125
0.71	40.68	325.5	1159
0.73	41.83	334.7	1193
0.77	44.2	353.6	1265
0.79	45.31	362.5	1298
0.81	46.47	371.8	1333
0.83	47.62	381.1	1368
0.87	50	399.8	1439

Graph



II)Torque vs speed graph

frequency=50,modulation index=0.87 voltage=399.5

Torque	Speed
25.14	1439
24.14	1442
23.14	1445
13.14	1470
11.14	1475

Torque vs Speed Graph