

NPC Converter for Wind Turbines.

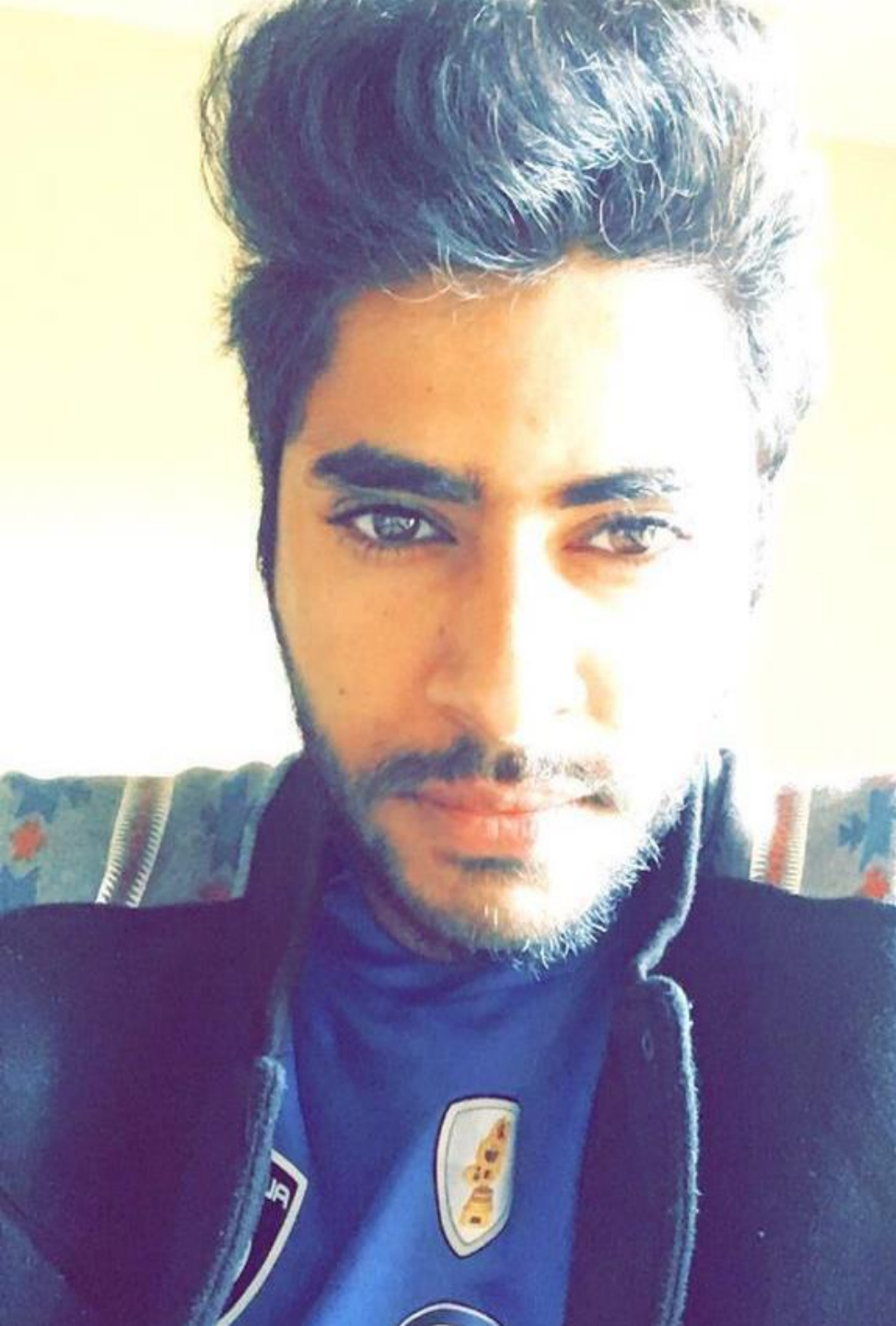
Mohamed Aldihani, Lazim Almutairi, &
Abdulelah Alajlan.

2019-2020





Mohamed
Aldihani, Team
Leader, &
Client
Contact.



Abdulelah Alajlan, Treasurer.



Lazim Almutairi, Time Scheduler.

Overview:

- Intro: Client and Project.
- Work breakdown structure(WBS).
- Timeline and responsibilities of all team.
- The Project Results.

Client:

Dr. Venkata Yaramasu.

Assistant Professor of
Electrical Engineering School
of Informatics, Computing and
Cyber Systems (SICCS).





Fig.1 NPC Converter project by team.

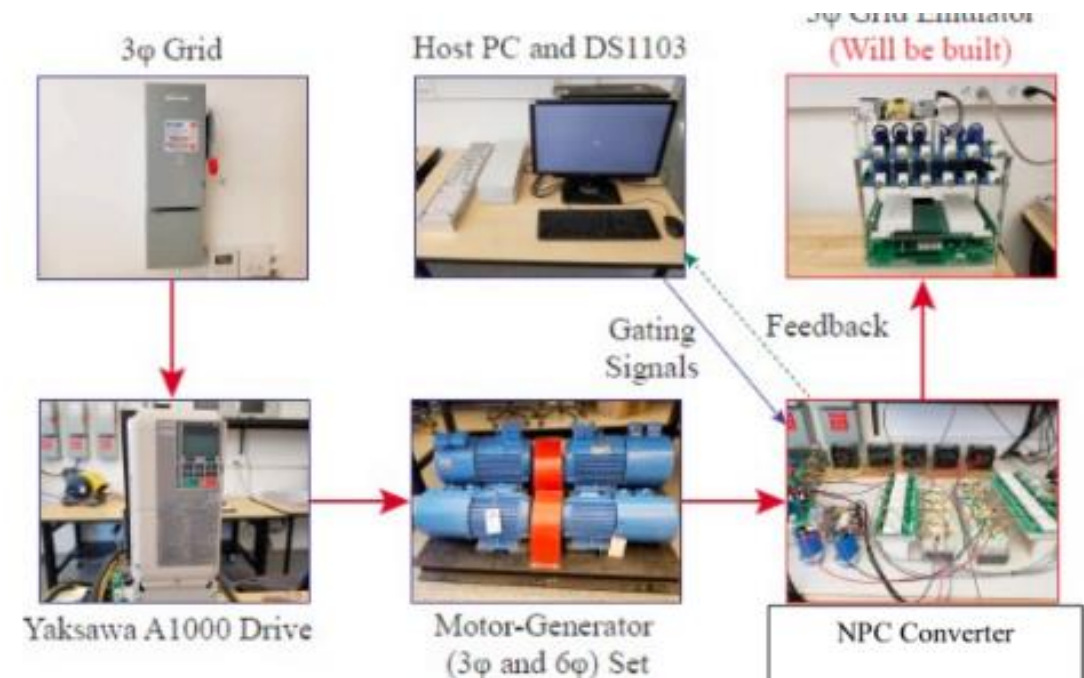
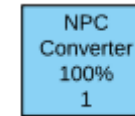


Fig.2 Diagram of NPC Converter project.

NPC Converter for Wind Turbines.

Work Breakdown Structure (WBS) for Neutral Point Clamped (NPC) Converter

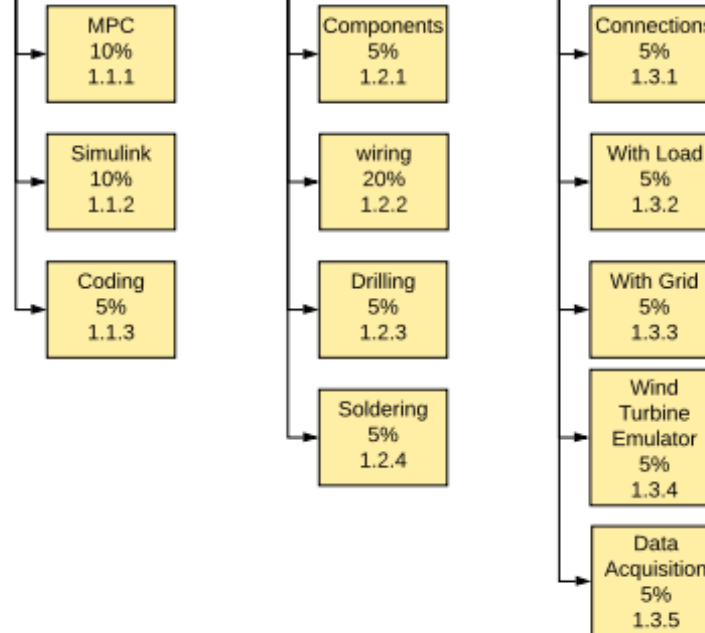
WBS LEVEL 1:



WBS LEVEL 2:



WBS LEVEL 3:



Work breakdown structure (WBS).

Timeline and Responsibilities (Mohamed Aldihani).

Timeline:

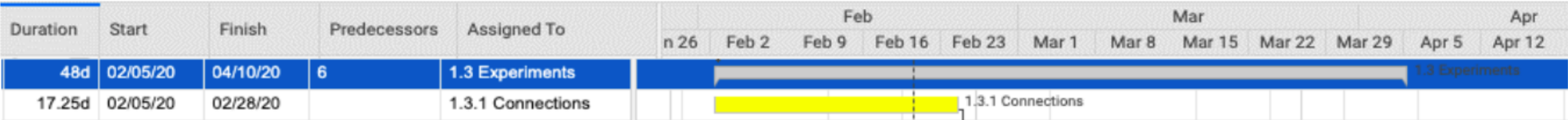


Fig. 4 Timeline Mohamed Aldihani.

Timeline and Responsibilities (Mohamed Aldihani).

Responsibilities:

- Connect all Devices of NPC Converter Project.
- Protection.



Fig.3 Shaft Coupling 8mm with motor.



Fig.4 Motor With speed sensor (encoder).

Video: Shaft Coupling 8mm



Timeline and Responsibilities (Lazim Almutairi).

Timeline:

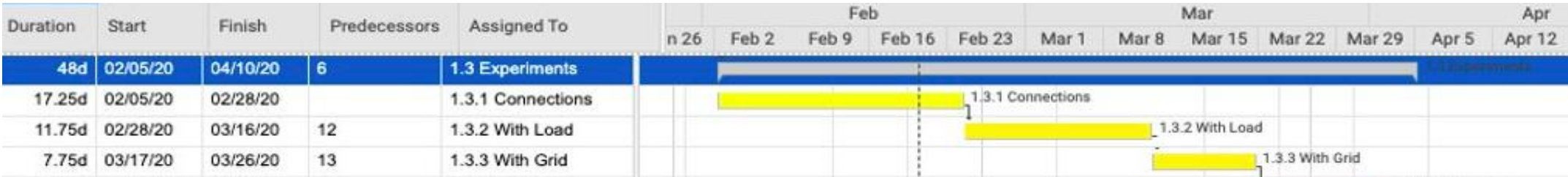


Fig.7 Timeline Lazim Almutairi.

Timeline and Responsibilities (Lazim Almutairi).

Responsibilities:

- Check NPC Converter with load.
- Check NPC Converter with Grid.

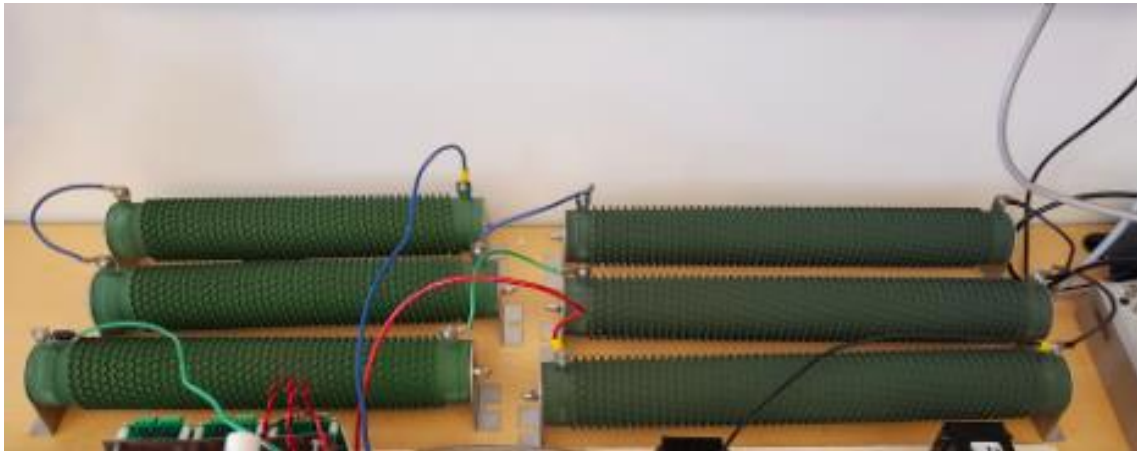


Fig.5 NPC Converter with load.



Fig.6 NPC Converter with Grid.

Timeline and Responsibilities (Abdulelah Alajlan).

Timeline:

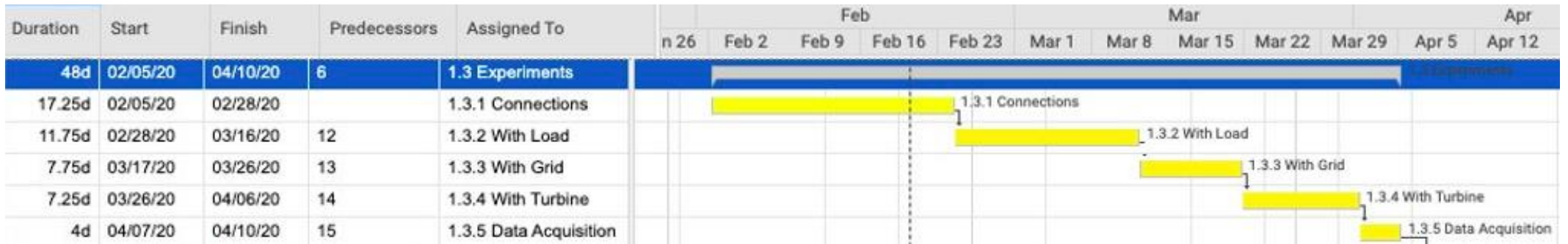


Fig. 10 Timeline Abdulelah Alajlan.

Timeline and Responsibilities (Abdulelah Alajlan).

Responsibilities:

- Parameter NPC Converter via Yaskawa A1000 Drive.
- Data acquisition.



Fig. 7. Parameter Yaskawa A1000 Drive

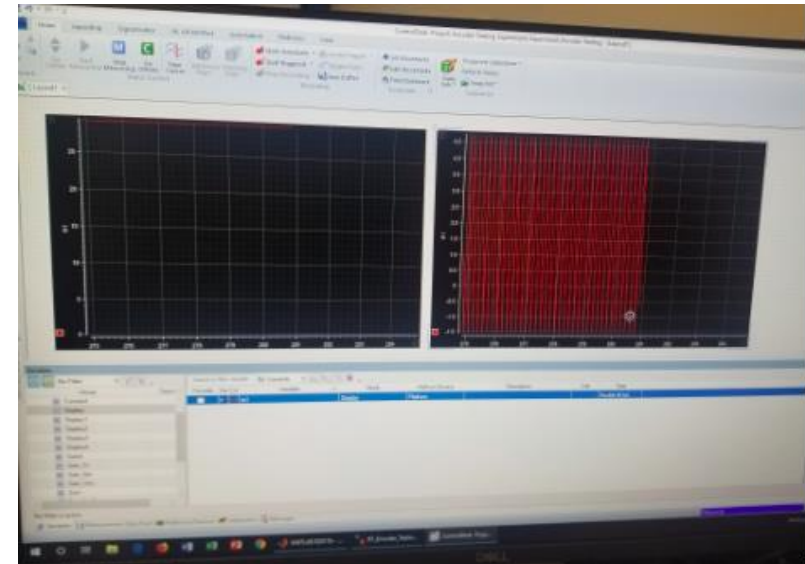


Fig. 8. Input Output NPC converter Data.

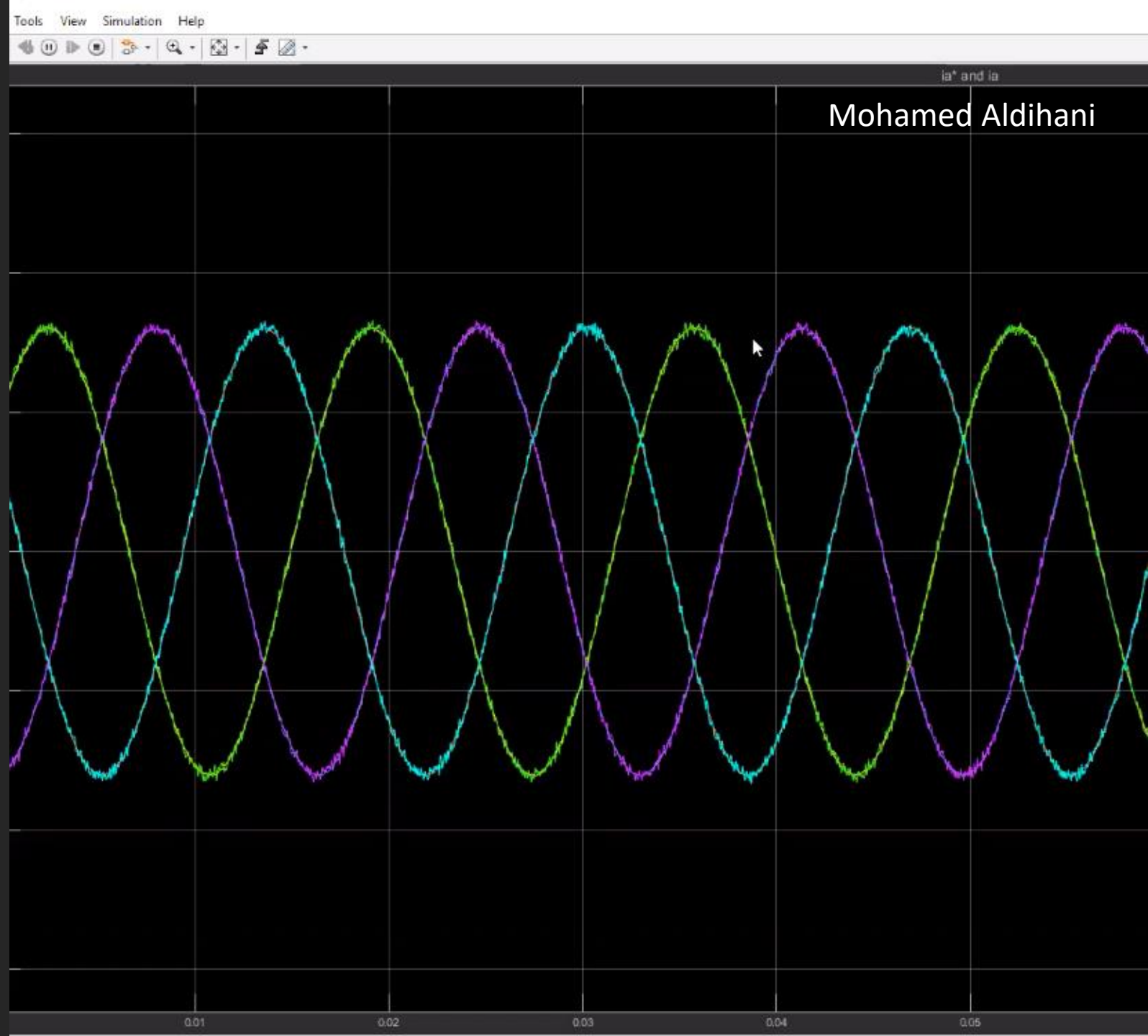
Video: Matlab

```

1 %% MATLAB Commands
2 clc, pack, clear all, close all, warning off
3 format long
4
5 %% Wind speed input
6 Pg_out = 0.8;
7 Vw_input = (Pg_out)^(1/3); % 0.9283 pu for 0.8 power; 1 pu for 1 pu power
8 Qg_out = sqrt(1-(Pg_out*Pg_out));
9 %Qg_out = 0;
10
11 %% Simulation Configuration Parameters
12 Ts = 50e-6; % Control sampling time (sec)
13 Tsim = 2e-6; % Simulation sample time (sec)
14 Tc = Ts^2; % Carrier frequency (Hz); change fsw here
15 %Tp = Tc/20; % Rate transition frequency
16 Fsamp = 1/Ts; % Control sampling frequency (Hz)
17
18 %% High Power (3000kW) Wind Turbine Parameters (Table A.1 Turbine#2)
19 FMR = -3000e3; % Turbine output power (W)
20 TMR = -1273.3e3; % Turbine output torque (N.m)
21 nMR = 22.5; % Turbine speed (rpm)
22 rGb = 1; % Gear ratio
23 vwR = 12; % Rated Wind Speed (m/s)
24 rT = 43.3553; % Turbine rotor radius (m) (Indigo wind turbine NORWIN 47-ASR-750kW)
25 vT = 12; % Rated Wind Speed (m/s)
26 Area = pi*rT^2; % Area of Swept of Turbine (m^2)
27 Rho = 1.225; % Air Density (Kg/m^3)
28 C1 = 0.3915; % Turbine Constant-1
29 C2 = 11.6; % Turbine Constant-2
30 C3 = 0.4; % Turbine Constant-3
31 C4 = 0; % Turbine Constant-4
32 C5 = 5; % Turbine Constant-5
33 C6 = 21; % Turbine Constant-6
34 C7 = 0.0192; % Turbine Constant-7

```


Matlab: Output NPC Converter for Wind Turbine.



Conclusion.

- Intro: Client and Project.
- Work breakdown structure(WBS).
- Timeline and responsibilities of all team.
- The Project Results.