Assignment 1

Dynamic Load and Fault Analysis of INPS using DPL

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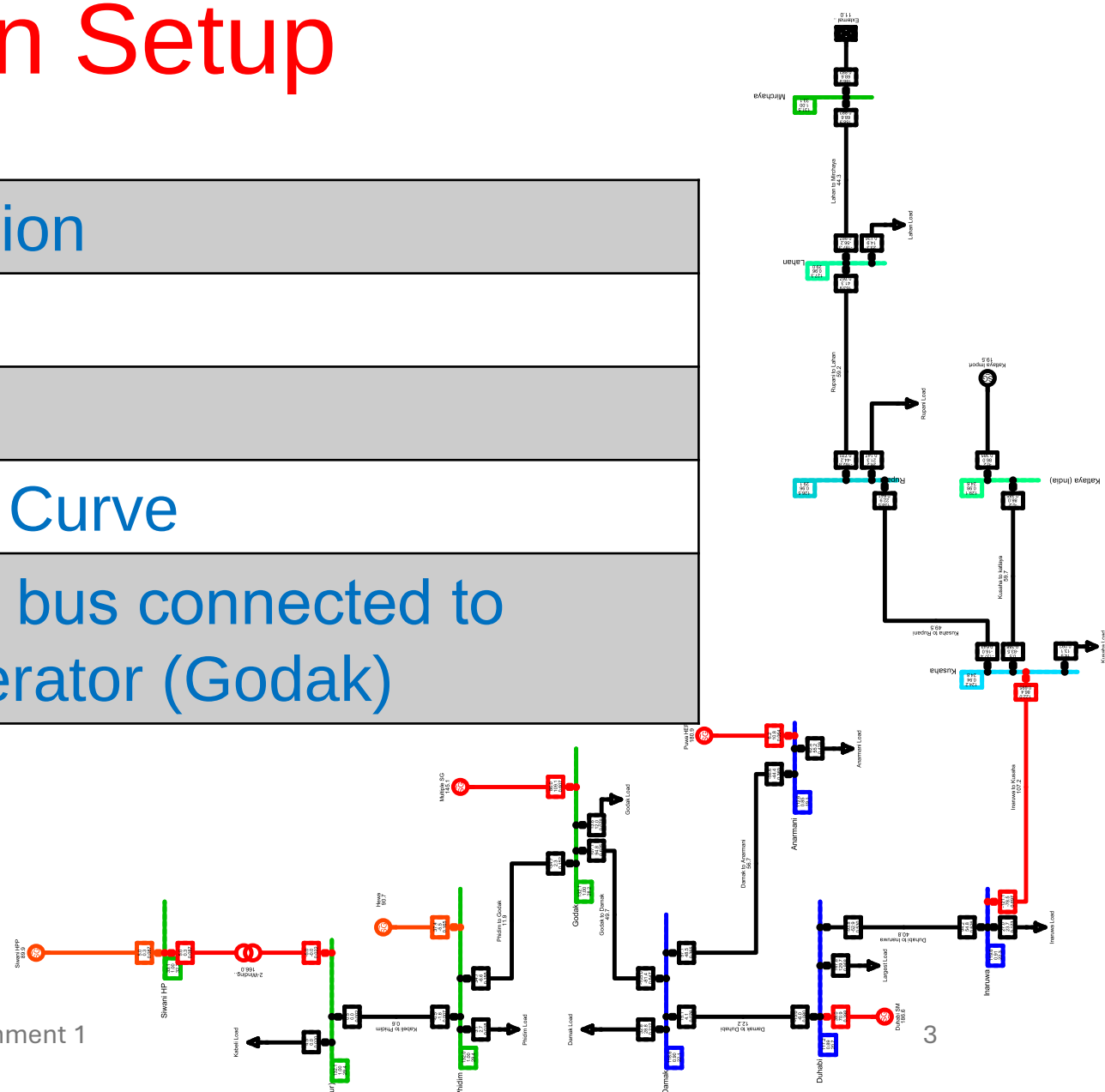
Objectives

Model	Section of the INPS system with at least five buses and two generators.
Analyze	Bus voltage variations under hourly load changes.
Examine	Effects of a self-clearing fault near the largest generator or critical line.
Present	Results for bus voltage, frequency, rotor angle, and other variables of interest.

Model and Simulation Setup

INPS Section	Eastern Region
No. of Buses	13
No. of Generators	6
Load Variation	Hourly Load Curve
Fault Type	3- Φ fault at bus connected to largest Generator (Godak)

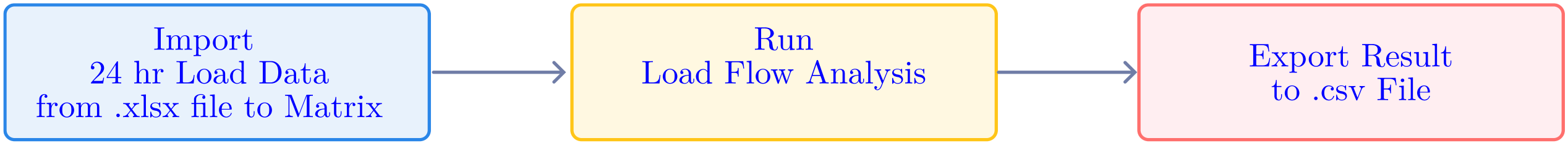


Section 1

Load Flow Analysis using DPL

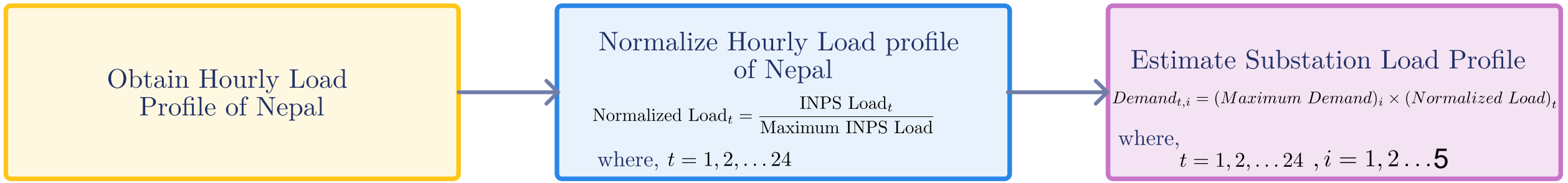
Steps Involved

- A DPL script is written to implement the following steps

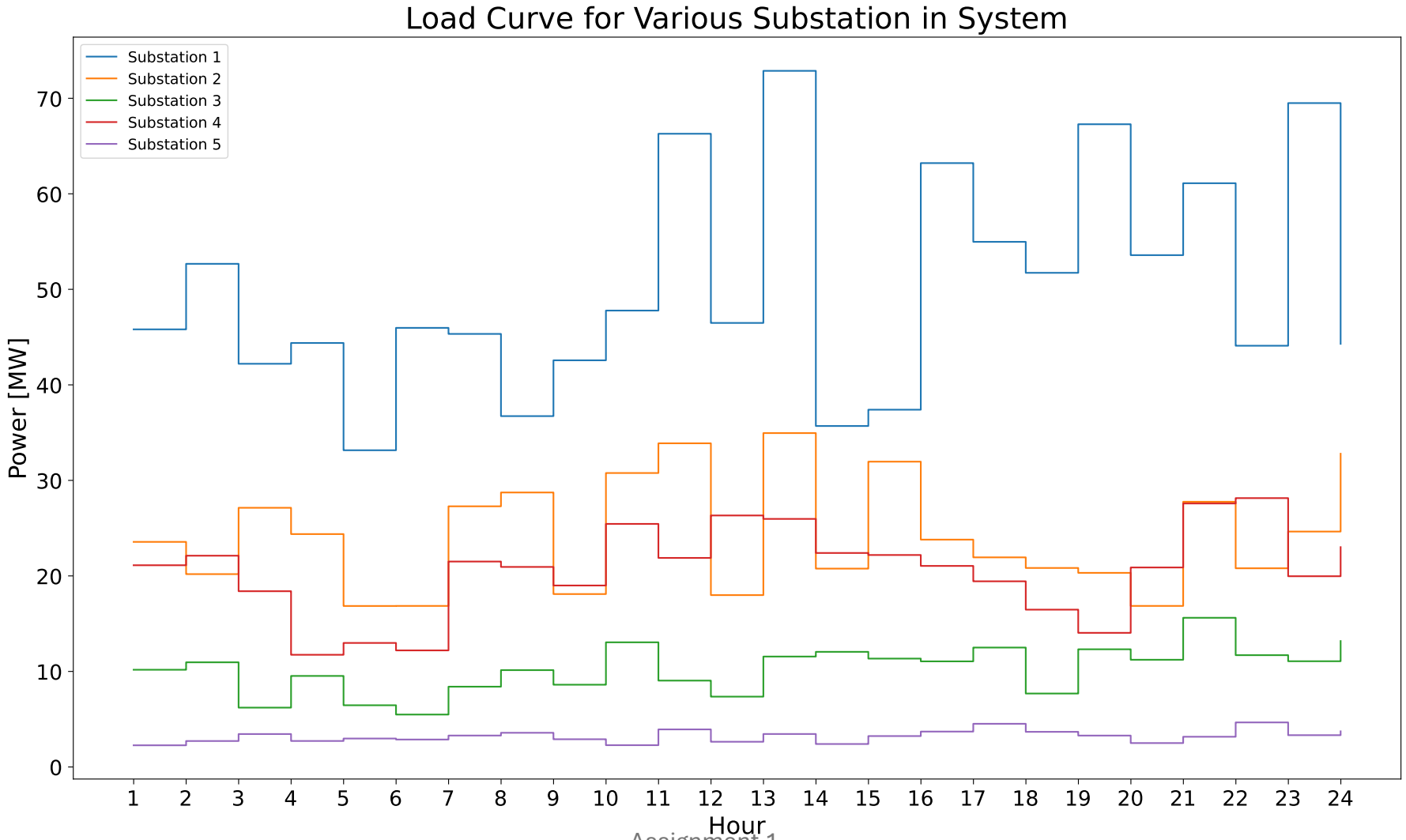


Load Profile Estimation

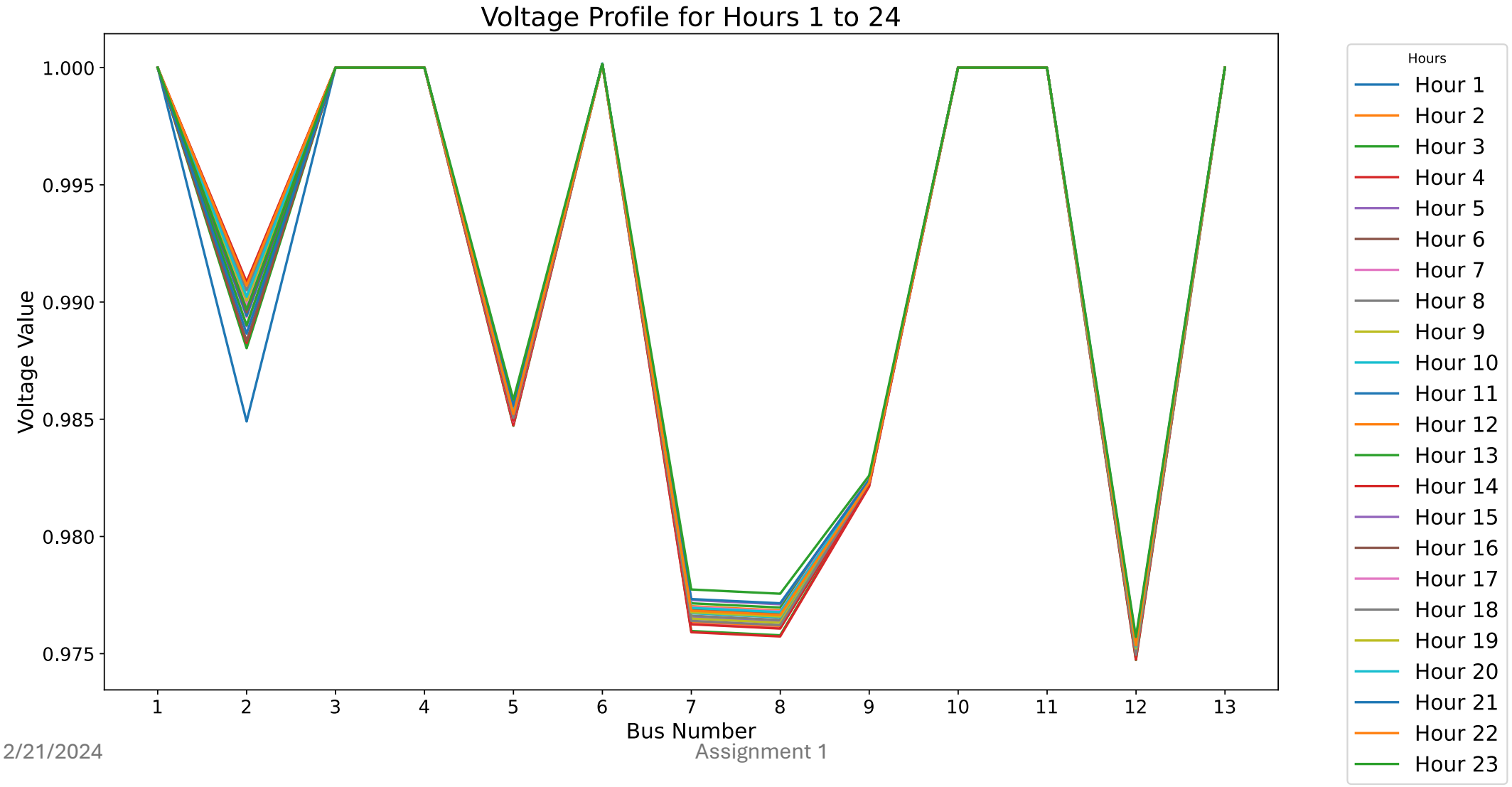
- In absence of load profile data, INPS load profile is used for estimating Hourly Load Profile



Estimated Load Curve



Bus Voltage profile after Load Flow



Section 2

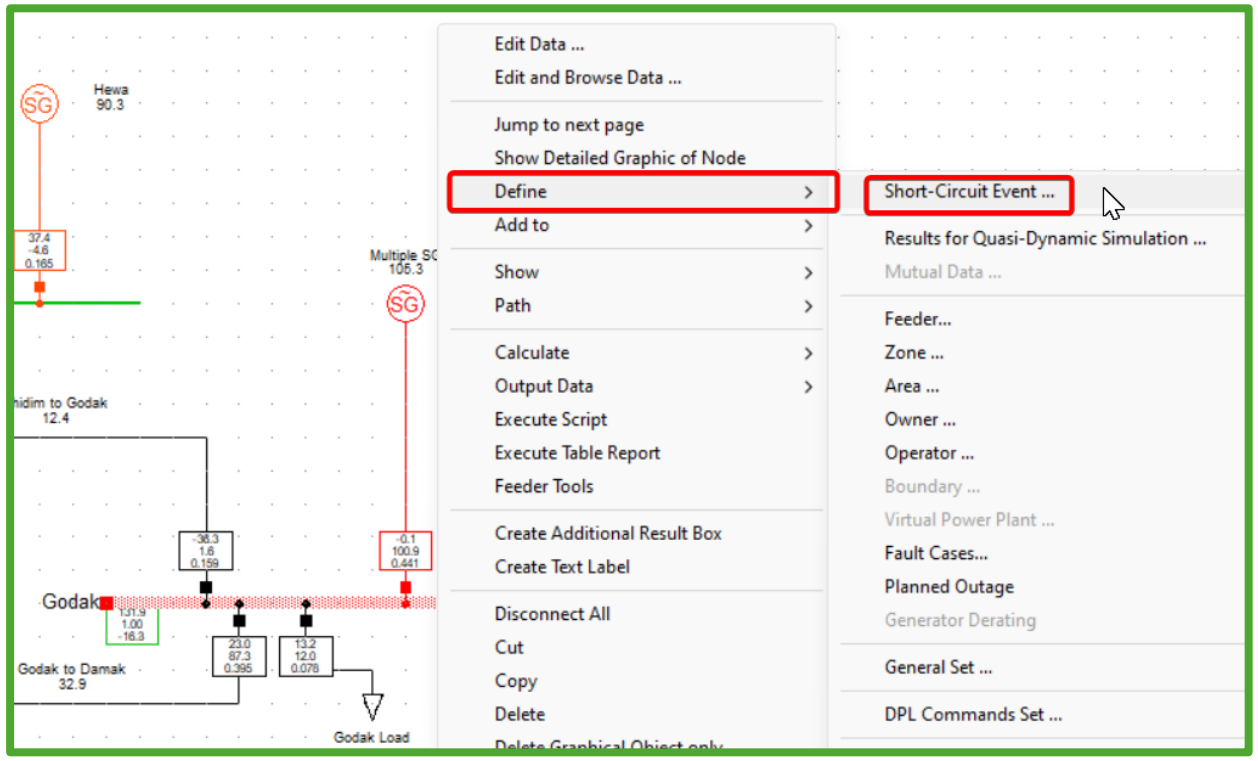
RMS Simulation

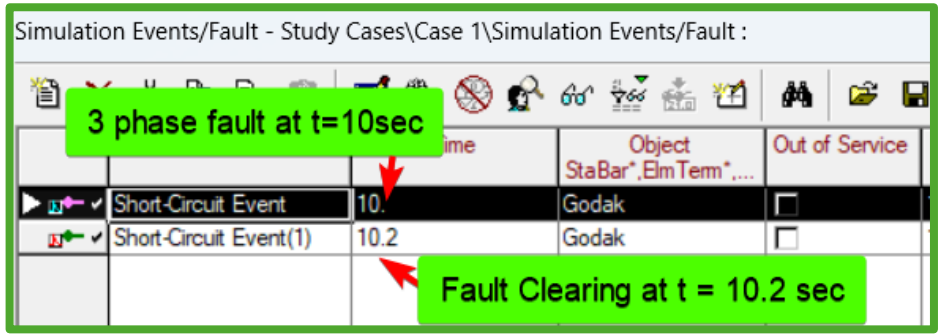
Setup for RMS Simulation

Fault in	Godak Bus
Fault Applied at	10 sec
Fault Cleared at	10.2 sec
Fault Type	3- Φ fault at bus connected to largest Generator (Godak)
Variables Monitored	Bus Frequency, Rotor Angle, Rotor Speed

Applying Fault in Largest Generation

- self-clearing fault near the largest generator





Steps Involved

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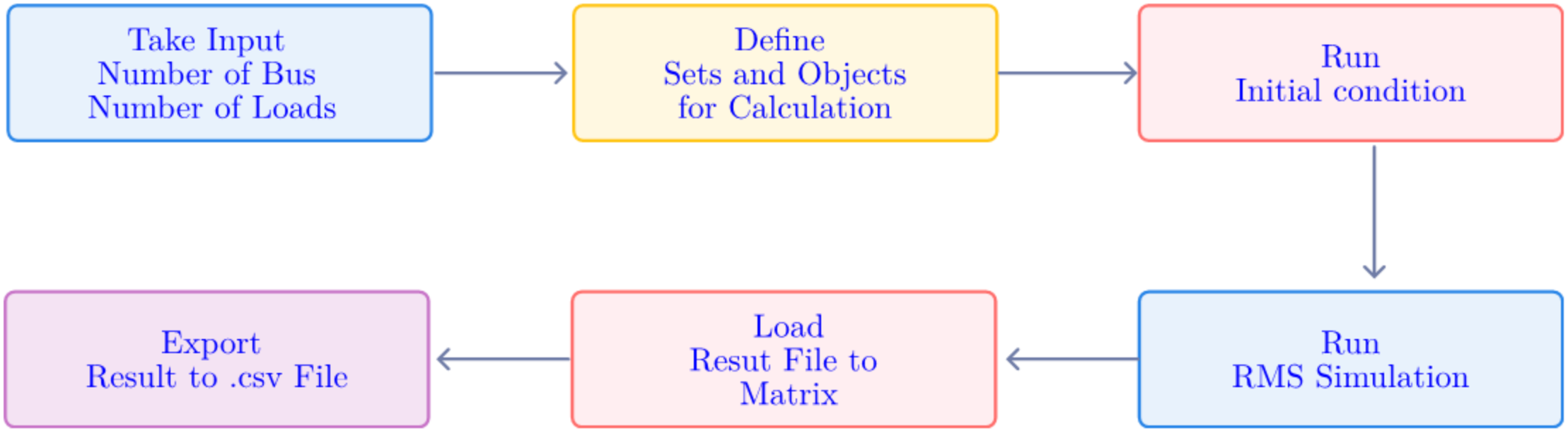
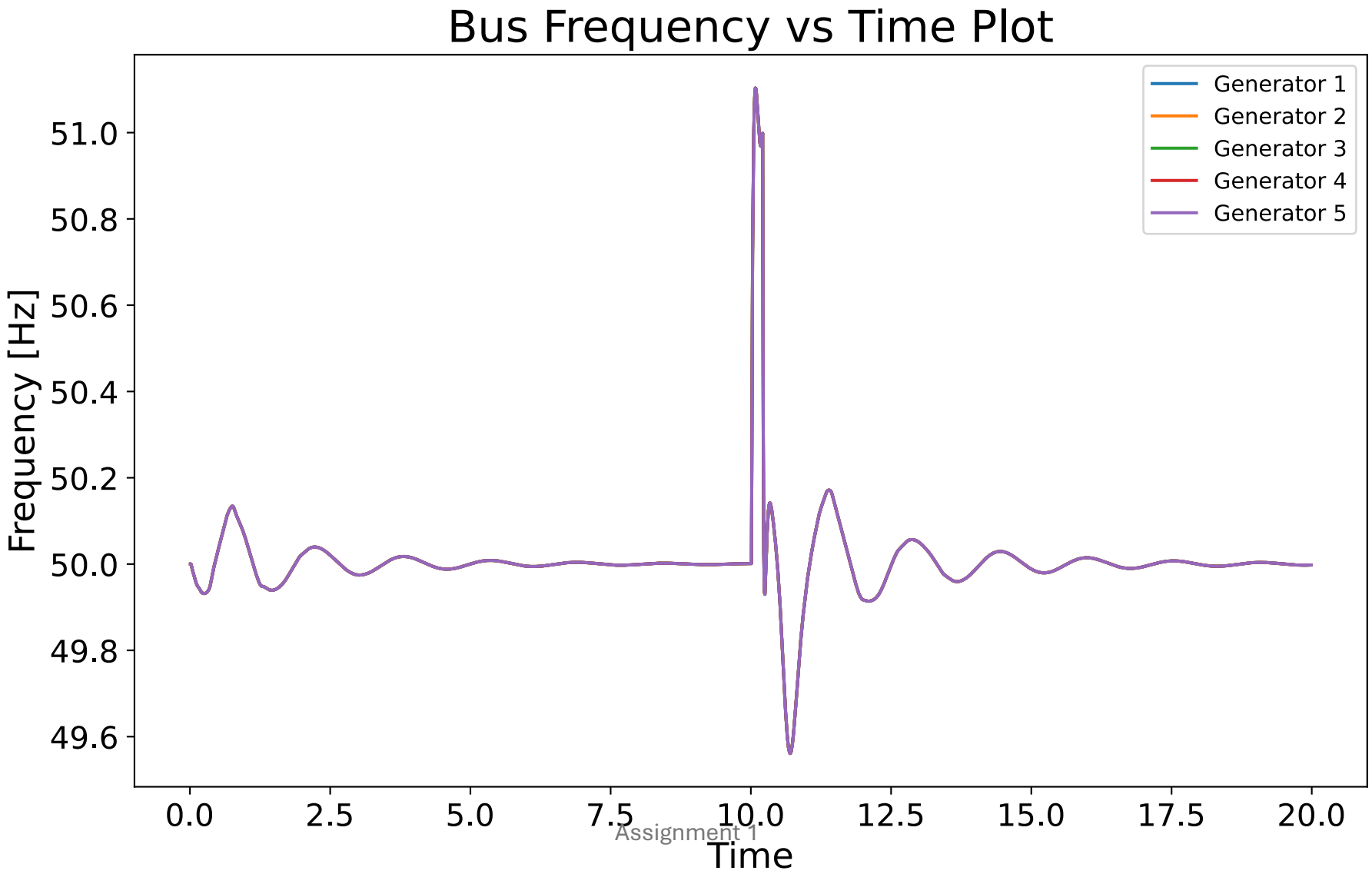
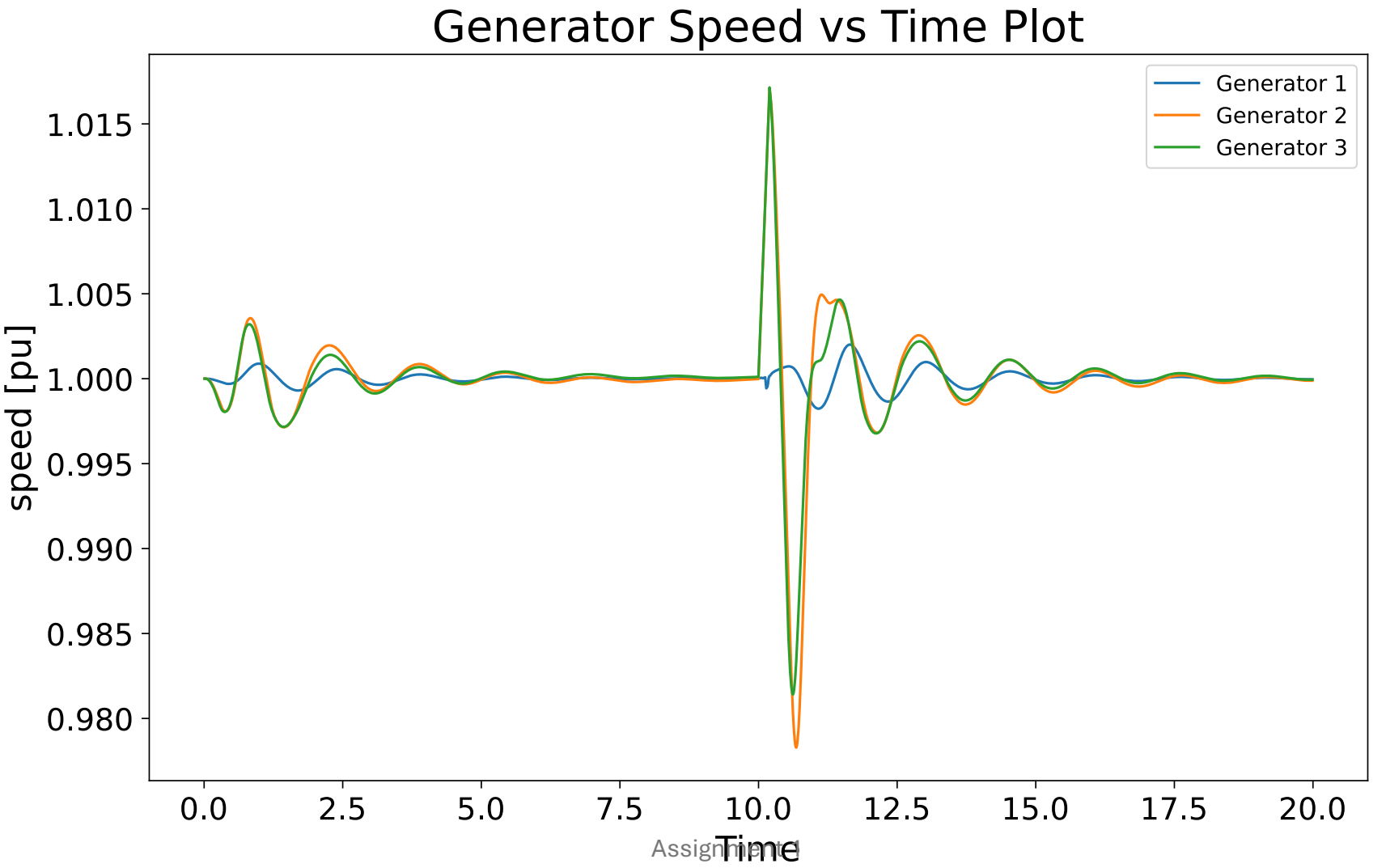


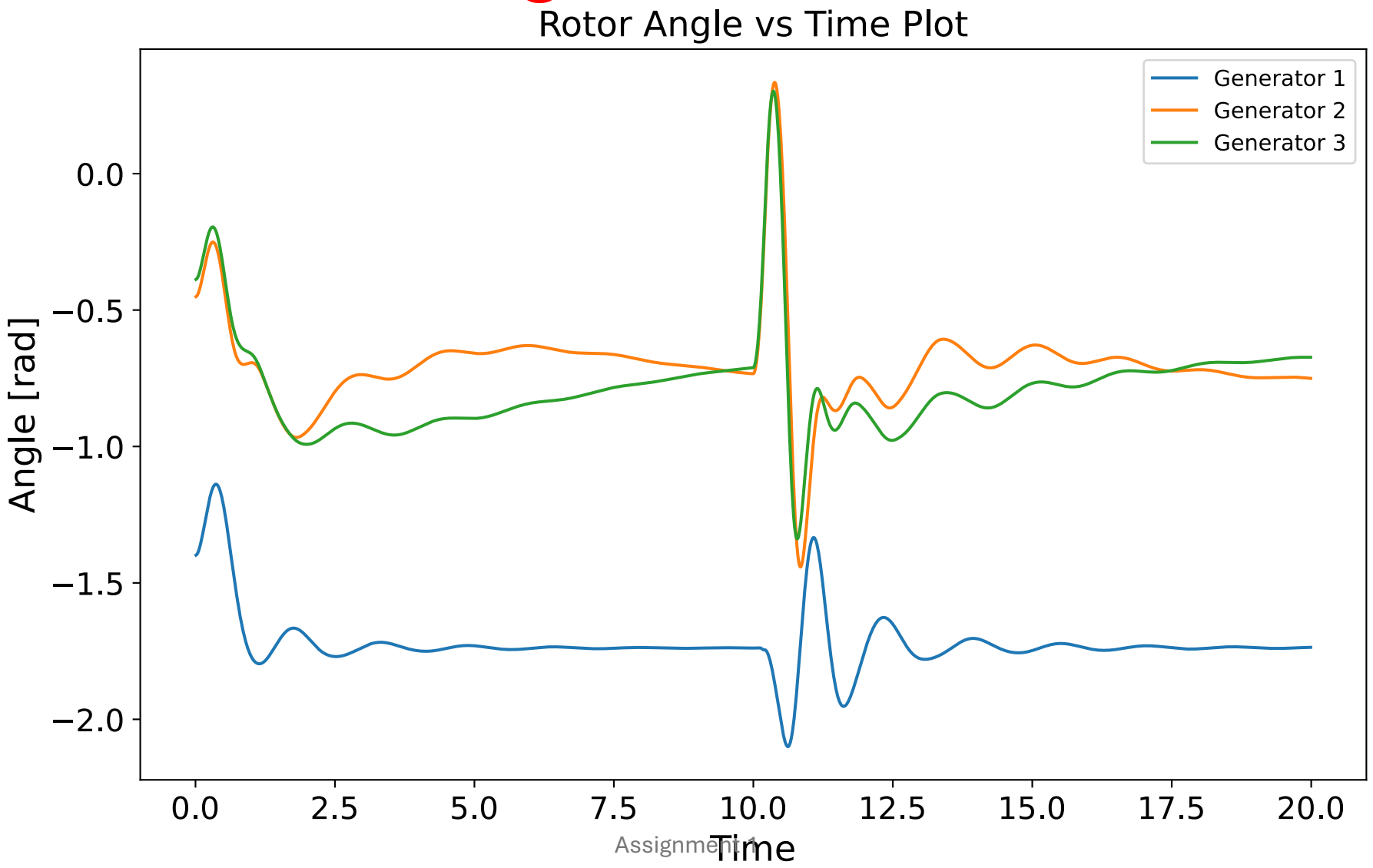
Plot for Bus Frequency



Plot for Generator Speed



Plot for Rotor Angle



Conclusions

- Dynamic Programming Language (DPL) is particularly useful for analyzing larger systems due to its flexibility and capability to handle complex power system simulations effectively.

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