

## **ABSTRACT**

Voltage and frequency control in the electrical system play a crucial role in maintaining the stability and reliability of power resources. The use of and inverters with PID control has been the focus of research efforts to enhance the efficiency and performance of the wind turbine power system. However, challenges arise in the form of voltage and frequency fluctuations that can impact the performance of connected electrical devices. This issue serves as the primary motivation for this research, with an effort to develop solutions to address potential instabilities.

As a solution to these challenges, this study proposes the implementation of PID control on inverters. This approach is expected to provide a quick and accurate response to changes in voltage and frequency, effectively maintaining system stability. The use of PID control offers advantages in automatically adjusting control parameters, resulting in improved performance and reducing the impact of fluctuations on connected devices. Thus, this research contributes to the development of a more reliable and efficient electrical system.

The research findings indicate that the implementation of PID control on inverters successfully reduces voltage and frequency fluctuations within acceptable limits. Quantitative data show a significant improvement in system stability, with voltage and frequency values remaining within the desired range. Meanwhile, qualitative data illustrate a rapid and accurate response of the system to load changes. In conclusion, the application of PID control on inverters provides an effective solution to enhance voltage and frequency control in the electrical system.

**Keywords: Inverter, PID Control, Voltage, Frequency.**