ABSTRACT

The use of renewable energy sources can have a positive impact on the environment and technology. However, with the positive impact of the presence of renewable energy, there are also problems with it, especially in the flow of power. Therefore, this work aims to analyze the power flow by knowing the results of total output losses due to the addition of channels and the penetration of renewable energy in determining the location of the bus channel with the best total loss reduction. The contribution given was regarding the results of power flow analysis due to the addition of channels in the modification of the IEEE 30 Bus system using the Newton Raphson and Gauss Seidel methods. In addition, to find out the output losses due to the addition of channels and the penetration of renewable energy, the total output losses can be found on the bus lines that experience the best loss reduction. The results of this work are to be able to determine the value of power flow using the Newton Raphson and Gauss Seidel methods, determine the decrease in the total loss value with the addition of channels, and analyze the total loss output value of the best channel location placement from both methods. It is hoped that this work will provide a deeper understanding of the performance of the Newton Raphson and Gauss Seidel methods in terms of overcoming the challenges of power flow analysis that has been modified by the IEEE 30 Bus system.

Keywords: *Gauss Seidel*, *IEE* 30 Bus, *Newton Raphson*, *losses, Renewable Energy*