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NUMERICAL METHODS IN LOAD FLOW ANALYSIS: AN APPLICATION TO THE NIGERIAN GRID SYSTEM

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ABSTRACT

Two primary considerations in the development of an effective engineering computer program are the formulation of a mathematical description of the problem and the application of a numerical method for a solution. The mathematical formulation of the load flow study results in system of algebraic nonlinear equations, and owing to this the numerical solution is reached by iteration. The different mathematical techniques used for load flow study are Gauss-Seidel, Newton-Raphson, Decoupled and Stott's fast decoupled methods. This paper presents the results of evaluation of study for running power flow program based on Gauss-Seidel, Newton-Raphson and Fast decoupled algorithms. Three tested system IEEE 5-Bus, IEEE 30-Bus and the Nigerian 28-Bus electrical power system are considered using the three numerical solutions. The numerical result of running power flow studies for IEEE 5-Bus, 30-Bus and the Nigerian 28-Bus systems are presented and comparatively discussed.

KEYWORDS: Fast Decoupled Gauss, Seidel, Iteration, Load Flow, Newton Raphson, Numerical Solution, Power Flow