

**COMPARISON OF NUMERICAL INTEGRATION BETWEEN
SIMPSON'S $\frac{3}{8}$ METHOD AND ROMBERG USING PERL
HYPERTEXT PREPROCESSOR PROGRAMMING**

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ABSTRACT

Difficult integral problems that cannot be solved analytically often require numerical approaches. PHP (Perl Hypertext Preprocessor) programming has become one of the tools that can be used to solve numerical problems. This research aims to develop a numerical integration program using the Simpson $\frac{3}{8}$ method and Romberg method on polynomial, exponential, and trigonometric functions with PHP programming, as well as to compare the efficiency of both methods based on relative error and execution time. Based on the implementation of the algorithms of both methods in PHP programming, the research results show that the average error for the Simpson $\frac{3}{8}$ method and Romberg method are 0,013787% and 0,001356%, respectively. The comparison of errors between these two methods indicates that the Romberg method is 9,89% more accurate than the Simpson $\frac{3}{8}$ method. However, in terms of program execution time, the Simpson $\frac{3}{8}$ method requires less time compared to the Romberg method. The average execution time for the Simpson $\frac{3}{8}$ method and Romberg method are 0,00117 seconds and 1,77811 seconds, respectively, and the comparison of execution time between these two methods shows that the Simpson $\frac{3}{8}$ method is shorter than the Romberg method when using the same number of iterations.

Keywords: *Method Comparison, Numerical Integration, Simpson $\frac{3}{8}$, Romberg, PHP Programming.*