CHAPTER 1
INTRODUCTION

1.1. Background

Suddenly, the Earth's crust was marked in the Earth's crust by the fracturing of rock layers. With more than 17,000 islands, Indonesia is the world's biggest archipelago. The Indo-Australian Plate, the Eurasian Plate, and the Pacific Plate all pass through Indonesia, making it particularly vulnerable to earthquakes. When energy builds up in a region to a point where it can no longer be absorbed, an earthquake can occur. Java, Sumatra, and Bali are the three Indonesian islands that experience the most earthquakes on a regular basis. Due to their location on an active plate border, the three islands frequently experience earthquakes. Indonesians may use earthquake forecasting as a way to be better prepared in the event of a devastating earthquake.

Forecasting is the process of analyzing previous occurrences in order to anticipate what will happen in the future (Frechtling, 2012). Double Exponential Smoothing (DES) is a modification of the Exponential Smoothing approach that can be utilized in forecasting (Wu et al., 2016). If you're looking to predict the future, you can use exponential smoothing to generate weighted combinations based on previous data, where newer data is regarded to be more important (Wu et al., 2016). Some of the DES approaches are Holt's two-parameter method, Brown's one-parameter method, and the two-parameter method known as "Double Exponential Smoothing (DES) Holt" (Adamuthe et al., 2015, Celik, 2016, Makridakis et al., 2008).

Double Exponential Smoothing Holt method is used in this study to anticipate earthquakes that will occur on the islands of Java, Sumatra, and Bali in the following period using the minimum MAPE value as a benchmark for the accuracy of forecasting findings to the original magnitude value and forecast value.

1.2. Problem Formulation

Based on what is described in the background, problems can be formulated, namely:

1. How does Holt's DES method work to analyze earthquake predictions based on the magnitude history that has been collected?

2. Is Holt's DES method effective for predicting earthquakes?

1.3. Scope

The limitations of the problem used in this study include:

1. Forecasting is done using time series data that has a weekly time period.

2. Plot the original magnitude value data and the predicted results to see the comparison.

1.4. Objective

The purpose of this study is to see whether the Holt DES method is good for predicting earthquakes using weekly time series data, and make the smallest MAPE as a reference for the accuracy of the prediction results, which later the results of this calculation can help people on the islands of Java, Sumatra and Bali to be alert. The potential for future earthquakes in the form of plot data.