UNIVERSITI TEKNOLOGI MARA
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SYSTEM IDENTIFICATION USING EXTENDED KALMAN FILTER

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ABSTRACT

System identification is getting more intensive from researcher to develop an algorithm with work efficiently and more accurate. Many algorithm have been proposed to do an estimation process such as Lavernberg-Marquardt (LM), Orthogonal Least Square (OLS), Recursive Prediction Error (RPE) and Modified Recursive Prediction Error (MRPE). In this project, the model look deeper on Extended Kalman Filter (EKF) based on their advantages and specialty compared to the other technique. Basically,Extended Kalman Filter (EKF) generally was known as the optimal estimator for a dynamic system. Then, this project to do an offline estimation of several data that has been selected to execute, offline estimation means that the estimation process operate with data are provided. Besides, Extended Kalman Filter (EKF) algorithm was selected in this project as an algorithm for offline estimation data purposes. In order to evaluate the performance of the EKF learning algorithm, the proposed algorithm validation were analyzed using model validation methods as a checker such as One Step Ahead (OSA) and correlation coefficient (R^2). The EKF algorithm performance was compared with Recursive Least Square (RLS) estimation algorithm as a comparison algorithm performance. All the coding simulation and the results analyzed was done using Matlab programming software.

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CHAPTER 1
INTRODUCTION

1.0 Overview

In this chapter briefly explain about background of study. Besides the problem statement explanation and objective of this project also briefly explain. Then, the generally about system identification was exposed and the thesis outline.

1.1 Background of Study

System identification can be divided into two major part. Firstly, its neural network structure and Selection of input-output (modeling of an unknown system). Second, the development of learning algorithm to update the tunable as a training algorithm for estimation purpose [1]. Here, the uses of Extended Kalman Filter (EKF) come out with an algorithm of estimation purpose to get the fast converge result. Generally the EKF already known as a method for dynamic systems.

1.2 Problem Statement

Identify a state-space model for modal parameter identification of large flexible space structures was applied for system identification techniques. Analysis of estimation system must give the intention to get the approximate data estimate. Realize of that probem, some approaches have been proposed in order to use an algorithm of extended Kalman filter as an estimation algorithm.

Some technique has been used few years before, traditional method basically based on the linear analysis. The traditional approaches still relevance to use but most of the system right now involved with non-linear. Moreover, traditional estimation methods are less competency when dealing with a large set of input features.