CHAPTER I
INTRODUCTION

The purpose to maximize products using the minimum energy usage and operating cost is always the primary target for process control system. The necessity to control all petroleum and petrochemical processes is because the manufacturing maintains process condition within certain range. The process control activities are about the process measurements and its reliability on the data satisfying mass balance, energy balance or other physical constraints of the process.

Process measurements in all petroleum and petrochemical processes are used for the purpose of evaluating the process performance; however, not all variables are measured because of operating and maintenance cost or some technical infeasibility. Furthermore, the measurements often contain the random and gross errors from of the changes in ambient condition, failure in network transmission or miscalibration, etc. (Narasimhan and Jordache, 2000), so the presence of random and gross errors in measurements leads to inaccurate process data. Moreover, the data also do not commonly satisfy the process constraints and the laws of conservasion, thus, many process control activities are needed to correct this problem. The method of improving the accuracy of process data by adjusting the measured variables and estimating the unmeasured variable to be achieved in the process constraints and the laws of conservasion, are known as "Data reconciliation" or DR. However, if the measurements are adjusted to satisfy the laws of conservation while in the presence of gross errors, all of the adjustments are often affected by such biases and would not generally be reliable. Thus, gross errors must be detected and eliminated by "Gross Error Detection" or GED.

The purposes of this work are to perform the data reconciliation with gross error detection technique for improving the data measurements of heat exchanger systems and to study the gross error detection in different techniques.