CHAPTER II

PURPOSE OF INVESTIGATION

The purpose of this investigation was to study the factors affecting the accuracy and precision of potentiometric titration of two weak acid mixtures by multiple linear regression analysis in the following way.

The first part of this investigation was to improve the titration equation of single weak acid and two weak acid mixture titration by using thermodynamic dissociation constant (Ka^o) of the weak acid instead of concentration dissociation constant (Ka). The equation used to approximate the effective variance of the measurements of random error (lack-of-fit) due to the statistical uncertainties of both the pH observed from the experiment and the volume of base was also derived.

The final part was to examine factors affecting the accuracy and precision of the equivalent volume of the individual weak acids obtained from multiple linear regression analysis of binary acids mixtures as followed :

1. The difference between pKa value of each weak acid.

2. The initial concentration ratios of both weak acids.

3. The changes of ionic strength of solution during the course of titration.

4. Titration data range being interpreted to find the appropriate range which gave accurate and reproducible results in equivalent volume determination.

5. The standard errors of pH measurement and volume of base.

From research studies, the appropriate experimental conditions were used for finding suitable applicability and limitation of the modified equation for the equivalent volume determination in potentiometric titration method.