CHAPTER I

INTRODUCTION

1.1 Background

Distillation is one of the most important processes in chemical industries especially in refinery and petrochemical processes. The general objective of distillation is the separation of compounds that have different vapor pressures at any given temperature. If a liquid mixture of two volatile material is heated, the vapor that comes off will have a higher concentration of the lower boiling material than the liquid from which it was evolved. Conversely, if a warm vapor is cooled, the higher boiling material has a tendency to condense in a greater proportion than the lower boiling material. A distillation column consists of a space for contacting vapor and liquid streams for the purpose of mass transfer between the two phases.

The changing of feed components, feed flow rate, reflux ratio, or any other operating conditions are all important factors that tend to influence column operation. The tridiagonal matrix distillation can be considered by writing material and energy balance including the accumulation terms for each tray in the column. In principle, the mathematical models describing distillation, especially for multicomponent and pseudocomponent distillation, are complex and have a large number of equations to be solved. Consequently, solution procedures are relatively difficult and tedious even are programmed for a high-speed digital computer.

For this reason, various mathematical procedure can be used to solve these equations with high accuracy, in this research, tridiagonal matrix distillation technique is select in order to change nonlinear to linear equation.

1.2 Objectives

1.2.1 To study the simulation of the petroleum fraction distillation based on thermodynamics properties generated by the SRK equation

1.2.2 To develop a program of petroleum fraction distillation

1.2.3 To study the sensitivity of the calculation result of the simulation program due to variation in the values of T_C, P_C and ω

1.3 Scopes of work

1.3.1 Create a computer program to determine material and energy in distillation column with thermodynamic properties generated by SRK equation of state.

1.3.2 Study the effect of number of pseudocomponents, T_C, P_C and ω on the simulation results

1.4 Benefits Expected

The developed petroleum fraction simulation program can be used to study the behavior of distillation when change in operating condition such as feed composition, temperature, pressure occur.