



CHAPTER V

CONCLUSIONS AND RECCOMMENDATIONS

5.1 Conclusions

The finite element method was studied, covering two-dimensional Poisson's equation and related transient form, and applied to representative of major problems in the field of chemical engineering, comprising both steady and transient heat and mass transfer phenomena. To accomplish this goal, the FEM application program was built via Visual Basic 6.0 programming language. The developed program was tested with four typical problems. The results exhibited applicability, reliability, accuracy, effectiveness, and including a very useful graphical interface of the program. However, the FEM solution did not show any advantage over finite-difference solution in case of simple geometry problems and the accuracy of FEM solution may be improved by using different mesh refinement. Selection of an appropriate meshing is a judgement that can be made by a user.

5.2 Recommendations

Generally, although the finite element method is a very effective method to solve many mathematical problems in various fields of study, efficient exploitation of its concept is strongly limited on both program designing and using steps, depending on program developers and users experience. Here, several ways to gain more abilities of FEM program can be proposed as,

1. Expanding to three-dimensional to make program more versatile
2. Applying to other problems with different kinds of mathematical models
3. Incorporating higher order basis function for more accuracy
4. Developing a new algorithm such as adaptive, moving finite element or automatic meshing etc.