

MATLAB SOLUTIONS TO THE CHEMICAL ENGINEERING PROBLEM SET

Joseph Brule, John Widmann, Tae Han, Bruce Finlayson²
Department of Chemical Engineering, Box 351750
University of Washington
Seattle, Washington 98195-1750

INTRODUCTION

These solutions are for a set of numerical problems in chemical engineering. The problems were developed by Professor Michael B. Cutlip of the University of Connecticut and Professor Mordechai Shacham of Ben-Gurion University of the Negev for the ASEE Chemical Engineering Summer School held in Snowbird, Utah in August, 1997. The problem statements are provided in another document.¹ Professors Cutlip and Shacham provided a document which shows how to solve the problems using POLYMATH, Professor Eric Nuttall of the University of New Mexico provided solutions using Mathematica and Professor J. J. Hwalek provided solutions using Mathcad. After the conference, Professor Ross Taylor provided solutions in Maple, and Edward Rosen provided solutions in EXCEL. This paper gives the solution in MATLAB. All documents and solutions are available from <http://www.che.utexas/cache>.

These solutions are obtained using the version 5.0 of MATLAB Pro. Minor changes are needed to the files when using version 4.0 of MATLAB, mainly in the command giving the limits of integration when solving ordinary differential equations. The appropriate commands (changes from MATLAB 5.0) are given in the files as comments. The program MATLAB runs by executing commands, which can call files called m-files. Given below are the commands and m-files. The m-files are also available on a diskette. For ease in interpreting the text below, text is printed in Times font, whereas the MATLAB files are printed in Geneva font. Each problem is solved by setting the path for MATLAB (most easily done by opening the appropriate m-file, and issuing the command Prob_X. The m-file Prob_X.m may call other m-files, which are described below and are on the diskette. In the description below, any line beginning with a % is a comment.

The authors thank Professor Larry Ricker for helpful comments on the first draft of this paper.

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² Joseph Brule just obtained his B.S. degree. Tae Han is a current undergraduate. Dr. John Widmann a recent Ph.D. graduate, and Bruce Finlayson is the Rehrberg Professor and Chair.

³ "The Use of Mathematical Software packages in Chemical Engineering", Michael B. Cutlip, John J. Hwalek, Eric H. Nuttall, Mordechai Shacham, Workshop Material from Session 12, Chemical Engineering Summer School, Snowbird, Utah, Aug., 1997.

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