Tutorial Letter 101/0/2022

Applied Linear Algebra

APM1513

Year module

Department of Mathematical Sciences

IMPORTANT INFORMATION:

This tutorial letter contains important information about your module.

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Define tommorow.

UNISA university of south africa

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1 INTRODUCTION

We are pleased to welcome you to this module and hope that you will find it both interesting and rewarding. We shall do our best to make your study of this module successful. You will be well on your way to success if you start studying early in the year and resolve to do the assignments properly.

You will receive a number of tutorial letters during the year. A tutorial letter is our way of communicating with you about teaching, learning and assessment. This tutorial letter contains important information about the scheme of work, resources and assignments for this module as well as exam admission. We urge you to read it carefully and to keep it at hand when working through the study material, preparing the assignment(s), preparing for the examination and addressing questions to your lecturers. In this tutorial letter, you will find the assignments as well as instructions on the preparation and submission of the assignments. This tutorial letter also provides all the information you need with regard to the prescribed study material and other resources and how to obtain it. Please study this information carefully and make sure that you obtain the prescribed material as soon as possible. We have also included certain general and administrative information about this module. Please study this section of the tutorial letter carefully. Right from the start we would like to point out that **you must read all announcements on myUnisa** you receive during the year **immediately and carefully**, as they always contain important and, sometimes urgent information.

We hope that you will enjoy this module and wish you all the best!

2 PURPOSE OF AND OUTCOMES FOR THE MODULE

2.1 Purpose

This module will be useful to students interested in developing the basic skills in linear algebra as well as to apply the software package “Octave” for all calculations. Note that we are using the latest version of “Octave” and this will be part of your study material which you will receive at registration for this module. Students credited with this module will have an understanding of the basic ideas of linear algebra and be able to apply the basic techniques for handling systems of linear equations, matrices, determinants and eigenvectors and linear programming. In all these topics you will be able to apply the software package Octave or Matlab to do all calculations.

2.2 Outcomes

The broad outcomes for this module are

- To solve systems of linear equations with the use of Octave or Matlab.
- To perform basic matrix operations.
- To use iterative methods to find appropriate solutions for systems
- To know what is meant by the eigenvalue equation, to be able to calculate the eigenvalue of a matric and its corresponding eigenvector and to be able to write the Octave or Matlab code to do so.

- To be able to solve linear programming problems and to give a geometric interpretation by means of an illustration in the two or more dimensional cases by using your software.

Specific outcomes are listed in the study guide.

3 LECTURER(S) AND CONTACT DETAILS

3.1 Lecturer(s)

The lecturers responsible for this module are as follows:

Prof. A. Kubeka
Tel: +2711 670 9157
Room no**:** 647
GJ Gerwel Building
Florida Campus
e-mail: kubekas@unisa.ac.za

Prof. J. Manale
Tel: (011) 471 2912
Room no**:** 646
GJ Gerwel Building
Florida Campus
e-mail: manaljm@unisa.ac.za

3.2 Department

The contact details of the department are as follows:

Department of Mathematical Sciences
Office: GJ Gerwel Building, Room 6-66
Telephone: +2711 670 9171
Fax: +2711 670 9171
E-mail: mathsciences@unisa.ac.za

3.3 University

If you need to contact the University about matters not related to the content of this module, please consult the *my Studies @ Unisa* brochure. Always use your student number when you contact the University.

4 MODULE RELATED RESOURCES

4.1 Prescribed books

There are no prescribed books for this module.

4.2 Recommended books

You may consult the following publication in order to broaden your knowledge of APM1513. A **limited** number of copies is available in the Library.

- B.D. Hahn *Essential MATLAB for Scientists and Engineers* (Pearson Education South Africa, Cape Town, 2002)

Recommended books may be requested telephonically from the Main Library in Pretoria by supplying the **request numbers** and your **student number**.

- Ayres, Frank: Schaum's Outline of Theory and problems of Matrices, McGraw-Hill, New York, 1974.
- Cullen, Charles G.: Matrices and Linear Transformations, Addison-Wesley, Reading, MASS., 1972.
- Johnson, Lee W.: Introduction to Linear Algebra (2nd or earlier editions), Addison-Wesley, Reading, MASS., 1989.
- Knopp, Paul J.: Linear Algebra, an Introduction, Hamilton Publishing Co., Santa Barbara, CALIF., 1974.
- Lipschutz, Seymour: Schaum's Outline of Theory and Problems of Linear Algebra, McGraw-Hill, New York, 1968.
- Nering, Evar D.: Elementary Linear Algebra, W.B. Saunders Publishing Co., Philadelphia, 1974.
- Nicholson,W.K.: Linear Algebra with Applications, (3rd edition), PWS Publishing Company, Boston.
- Kolman, Bernard & Hill, David R.: Introductory Linear Algebra; An Applied First Course (8th edition or earlier), Prentice Hall, 2005.
- Grossman, Stanley I.: Elementary Linear Algebra (any edition), Wadsworth Publishing Co., Belmont, CA., 1991.

NOTE: Do not feel that you **should** study from these books, simply because we have provided you with this list. Sometimes, however, if one really gets bogged down on a particular section or part of the work, a different presentation might just be what is needed to get going again.

4.3 Electronic Reserves (e-Reserves)

There are no e-Reserves for this module.

5 STUDENT SUPPORT SERVICES FOR THE MODULE

For information on the various student support systems and services available at Unisa (e.g. student counselling, tutorial classes, language support), please consult the *my Studies @ Unisa* that you received with your study material.

5.1 Contact with Fellow Students

5.1.1 Study Groups

It is advisable to have contact with fellow students. One way to do this is to form study groups. **Please consult the publication my Studies@Unisa to fnd out how to obtain the addresses ofstudents in your region.**

5.2 myUnisa

If you have access to a computer that is linked to the internet, you can quickly access resources and information at the University. The myUnisa learning management system is Unisa s online campus that will help you to communicate with your lecturers, with other students and with the administrative departments of Unisa - all through the computer and the internet.
Joining myUnisa will offer you the following benefits:

- You have access to the additional resources on this module.
- You will be able to immediately download all your study material from this site, in electronic format.
- You can use the discussion forum to communicate with your fellow students.
- You can contact your lecturer through the e-mail link of your myUnisa module page.

For this module, the lecturer will use announcements and FAQs (frequently asked questions) throughout the year. You will also be able to access self assessment quizzes, which will help you know how well you understand the study material.

To go to the myUnisa website, start at the main Unisa website, http://www.unisa.ac.za, and then click on the ”Login to myUnisa” link on the right-hand side of the screen. This should take you to the myUnisa website. You can also go there directly by typing in http://my.unisa.ac.za. On the website you will find general Unisa related information, plus a module site for each module you are registered for. Please consult the publication *my Studies @ Unisa* which you received with your study material for more information on myUnisa.

5.3 e-Tutors

Information on e-tutoring and face-to-face tutoring offerings at Unisa

Please be informed that, with effect from 2013, Unisa offers online tutorials (e-tutoring) to students registered for modules at NQF level 5 and 6, this means qualifying first year and second year modules. You are lucky since this module falls in this category.

Once you have been registered for this module, you will be allocated to a group of students with whom you will be interacting during the tuition period as well as an e-tutor who will be your tutorial facilitator. Thereafter you will receive an sms informing you about your group, the name of your e-tutor and instructions on how to log onto MyUnisa in order to receive further information on the e-tutoring process.

Online tutorials are conducted by qualified E-Tutors who are appointed by Unisa and are offered free of charge. All you need to be able to participate in e-tutoring is a computer with internet connection. If you live close to a Unisa regional Centre or a Telecentre contracted with Unisa, please feel free to visit any of these to access the internet. E-tutoring takes place on MyUnisa where you are expected to connect with other students in your allocated group. It is the role of the e-tutor to guide you through your study material during this interaction process. For your to get the most out of online tutoring, you need to participate in the online discussions that the e-tutor will be facilitating.

Moreover, there are modules which students have been found to repeatedly fail, these modules are allocated face-to-face tutors and tutorials for these modules take place at the Unisa regional centres. These tutorials are also offered free of charge, however, it is important for you to register at your nearest Unisa Regional Centre to secure attendance of these classes.

6 MODULE SPECIFIC STUDY PLAN

Study plan	Year Module
Outcomes 1.1 to 3.3 to be achieved by	15 May
Outcomes 3.4 to 5.6 to be achieved by	22 August
Outcomes 6.1 to 6.6 to be achieved by	15 September
Revision	25 September

See the brochure *my Studies @ Unisa* for general time management and planning skills.

7 MODULE PRACTICAL WORK AND WORK INTEGRATED LEARNING

There are no practicals for this module.

8 ASSESSMENT

8.1 Assessment plan

There are three assignments for APM1513. For each assignment there is a **FIXED CLOSING DATE**; the date by which the assignment **must reach** the university.

Late assignments will be marked, but will be awarded 0%.

Written assignments (Assignments 01, 02 and 03)
Not all the questions in the written assignments will be marked and you will also not be informed beforehand which questions will be marked. The reason for this is that you learn by doing examples, and it is therefore extremely important to do as many problems as possible. You can self assess the questions that are not marked by comparing your solutions with the printed solutions that will be sent to you.

8.2 General assignment numbers

The assignments are numbered as 01, 02 and 03.

8.2.1 Due dates for assignments

The closing dates for submission of the assignments are:

YEAR MODULE

Assignment no	Fixed closing date
01	15 May 2022
02	22 August 2022
03	15 September 2022

8.3 Submission of assignments

Please note: Although students may work together when preparing assignments, each student must write and submit his or her own individual assignment. It is unacceptable for students to submit identical assignments on the basis that they worked together. That is copying (a form of plagiarism) and none of these assignments will be marked. Furthermore, you may be penalised or subjected to disciplinary proceedings by the University.

Assignments should be addressed to:

The Registrar
P O Box 392
UNISA
0003

You may submit written assignments and assignments done on mark-reading sheets either by post or electronicaly via *myUnisa*. Assignments may **not** be submitted by fax or e–mail. For detailed information and requirements as far as assignments are concerned, see the brochure *my Studies @ Unisa* that you received with your study material.

To submit an assignment via myUnisa:

- Go to *myUnisa*.
- Log in with your student number and password.
- Select the module.
- Click on assignments in the left-hand menu.
- Click on the assignment number you wish to submit.
- Follow the instructions on the screen.

8.4 Assignments

YEAR MODULE
ASSIGNMENT 01
Getting started with MATLAB/Octave.
Introduction to programming with MATLAB/Octave.
Use of MATLAB/Octave to solve linear systems of equations.
FIXED CLOSING DATE: 15 May 2022

- The assignment must be answered using Octave (or MATLAB), and for each question you must include your computer code including any .m files used, as well as the output. These should be copied and pasted into a word processing system, and you should produce a single file containing all the answers to the questions in the assignment, which can then be printed out, for hard copy submission, or submitted electronically via *MyUnisa*.
- We **will not accept** hand-written solutions, or anything that does not contain Octave (or MATLAB) code and output.
- In many questions, as well as the computer code and output, you will need to include some form of comment in your answer. This should be in the form of complete sentences that make sense to the reader.
- You should use a fixed space font such as courier for computer code and output, and something else for discussion.
- Question 1 does not carry any marks, but is **compulsory** as it enables us to check that your student number was actually used in an Octave (or MATLAB) session.
- There are 60 marks distributed as shown, and 60 marks = 100%.

QUESTION 1

Enter the following two commands, and copy and paste the output as your answer
¿ rand(”state”,student_number0919);
¿ rand(1)
where student_number0912 is your student number with ”0919” at the end and with ”-” removed. For example, if your student number is 123-456-7, you would enter
¿ rand(”state”,12345670919);
¿ rand(1)

QUESTION 2

The command *etime* takes as input two 6-dimensional row vectors. Use the help facility for *etime* and emphasize to find out more. Then find the number of seconds between 09h 27m 35s on 17 February 2002, and 17h 49m 02s on 23 August 2006. [10]

QUESTION 3

Evaluate the series

$$1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \frac{1}{9} - ... + \frac{1}{1001}.$$

[10]

QUESTION 4

Evaluate the series $\sum_{n=1}^{\infty} u_n$ in which u_n is not known explicitly but is given in terms of a recurrence relation. You should stop the summation when $|u_n| < 10^{-2}$

$$u_{n+1} = (u_{n-1})^2 + (u_n)^{1.5} \text{ with } u_1 = 0.1,\ u_2 = 0.2$$

[20]

QUESTION 5

Plot, on the same graph, the two functions

$$\begin{aligned} x &= e^{0.6667t} - 1.5 \\ y_{i+1} &= \cos\left(t^2\right) \end{aligned}$$

in the range $-2 \leq t \leq 2$. Use the graph to estimate the value of t at which the two functions intesect. [10]

QUESTION 6

Given

$$x_k = \frac{L_k}{L_k\sqrt{L_k + 20\pi^2}}$$

where

$$L_k = \frac{1}{1 + \frac{1}{k}},\ k = 1 \cdots 47$$

find

$$S = \mathbf{x}.\mathbf{L} = \sum_{K=1}^{47} x_k L_k$$

[10]

QUESTION 7

A is a 3×100 matrix as follows

$$\begin{pmatrix} 1 & 2 & \cdots & \cdots & 100 \\ 101 & 102 & \cdots & \cdots & 200 \\ 201 & 202 & \cdots & \cdots & 300 \end{pmatrix}$$

Let $B = A'A$ (where A' is the transpose of A), then find $B_{5,6}$.

Total [60]

YEAR MODULE
ASSIGNMENT 02
Use of MATLAB/Octave to solve linear systems of equations.
Overdetermined and underdetermined systems of linear equations.
Eigenvalues, eigenvectors and matrix diagonalization.
FIXED CLOSING DATE: 22 August 2022

- The assignment must be answered using Octave (or MATLAB), and for each question you must include your computer code including any .m files used, as well as the output. These should be copied and pasted into a word processing system, and you should produce a single file containing all the answers to the questions in the assignment, which can then be printed out, for hard copy submission, or submitted electronically via *MyUnisa*.
- We **will not accept** hand-written solutions, or anything that does not contain Octave (or MATLAB) code and output.
- In many questions, as well as the computer code and output, you will need to include some form of comment in your answer. This should be in the form of complete sentences that make sense to the reader.
- You should use a fixed space font such as courier for computer code and output, and something else for discussion.
- Question 1 does not carry any marks, but is **compulsory** as it enables us to check that your student number was actually used in an Octave (or MATLAB) session.
- There are 100 marks distributed as shown, and 100 marks = 100%.

QUESTION 1

Enter the following two commands, and copy and paste the output as your answer
¿ rand(”state”,student_number0914);
¿ rand(1)
where student_number0913 is your student number with ”0914” at the end and with ”-” removed. For example, if your student number is 123-456-7, you would enter
¿ rand(”state”,12345670914);
¿ rand(1)

QUESTION 2

Solve the following systems of equations, using the $A\backslash b$ construct, as well as the Gauss-Seidel method with a tolerance of $10 - 7$ (in some cases convergence may not occur).

(a) $0.1x_1 + 0.05x_2 + 0.1x_3 = 1.3$
$12x_1 + 25x_2 - 3x_3 = 10$
$-7x_1 + 8x_2 + 15x_3 = 2$ [5]

(b) $12x_1 + 3x_2 + 4x_3 - 2x_4 = 12$
$2x_1 + 10x_2 - x_3 - 20x_4 = 15$
$x_1 - x_2 + 20x_3 + 4x_4 = -7$
$x_1 + x_2 + 20x_3 - 3x_4 = -5$ [5]

QUESTION 3

Modify the function file gauss_seidel.m to produce a new function file Jacobi.m that implements the jacobi method. Now use the Jacobi method to solve example 3.2.1, i.e.
$20x_1 - x_2 + x_3 = 17$
$x_1 - 10x_2 + x_3 = 15$
$-x_1 - x_2 + 10x_3 = 18$ [20]

QUESTION 4

Define the100×100 square matrix A and the column vector b by

$$A_{ij} = I_{ij} + \frac{1}{-j^2+1},\ b_i = 1 + \frac{2}{i},\ 1 \le i, j \le 100$$

where I_{ij} is the 100×100 identity matrix (i.e. 1 on the main diagonal and 0 everywhere else). Solve $Ax = b$ for x using both the Gauss-Seidel method and the $A\backslash b$ construct. Do not give the whole vector x in your output, but only $x_2,\ x_{50}$ and $x_{99}.$ [20]

QUESTION 5

A formula for the population of the USA is

$$P(t) = P_0 - ae^{-0.02(t-1800)}$$

where t i s the date in years. Some actual data is as follows

Date	Population
1800	5308000
1820	9638000
1840	17069000
1870	38558000
1900	75995000
1930	122775000
1950	150697000

Find values of P_0 and a that give a best fit of the formula to the data. Produce a graph showing the function $P(t)$ against time as a continuous line, together with the given data points as discrete points [20]

QUESTION 6

Find the cubic polynomial that best fits the data points
$(x, y) = (-1, 14)\,,\ (0, -5)\,,\ (1, -4)\,,\ (2, 1)\,,\ (3, 22)\,.$
Produce a graph showing the polynomial, together with the given data points as discrete points.[5]

QUESTION 7

Find the eigenvalues and eigenvectors of the following matrices, using both *eig* and *power_method* (for the dominant eigenvalue and eigenvector). If the power method fails, discuss why. For those matrices that are diagonalizable, give the diagonalized matrix.

(a)

$$\begin{pmatrix} 2.781344 & -1.921334 & 0.493612 & 1.367198 & -1.014289 \\ 0.015050 & -0.205731 & 0.903377 & 1.780261 & -0.824057 \\ -0.087144 & 0.606003 & 2.977860 & -0.140473 & -0.750938 \\ 0.212440 & -2.477599 & 0.980236 & 4.233562 & -1.207581 \\ -0.136646 & -1.168924 & 0.453692 & 0.915245 & 1.712964 \end{pmatrix}$$

[5]

(b)

$$\begin{pmatrix} -1.54575 & -3.47002 & -1.70112 & -2.58917 \\ -3.28104 & -2.07998 & -1.45597 & -2.75629 \\ 0.55497 & 0.94078 & 2.02863 & 0.46100 \\ 8.94120 & 9.67047 & 4.47796 & 9.09710 \end{pmatrix}$$

[5]

QUESTION 8

Consider the fictional species, and suppose that the population can be divided into three different age groups: babies, juveniles and adults. Let the population in year n in each of these groups be

$$x_{(n)} = \begin{pmatrix} x_{b(n)} \\ x_{j(n)} \\ x_{a(n)} \end{pmatrix}$$

The population changes from one year to the next according to $x_{(n+1)} = Ax_{(n)}$, where the matrix A is

$$A = \begin{pmatrix} 1/2 & 5 & 3 \\ 1/2 & 0 & 0 \\ 0 & 2/3 & 0 \end{pmatrix}$$

In the long term, what will be the relative distribution of the population amongst the age groups?

[15]

Total [100]

YEAR MODULE
ASSIGNMENT 03
Linear programming
FIXED CLOSING DATE: 15 September 2022

- The assignment must be answered using Octave (or MATLAB), and for each question you must include your computer code including any .m files used, as well as the output. These should be copied and pasted into a word processing system, and you should produce a single file containing all the answers to the questions in the assignment, which can then be printed out, for hard copy submission, or submitted electronically via *MyUnisa*.
- We **will not accept** hand-written solutions, or anything that does not contain Octave (or MATLAB) code and output.
- In many questions, as well as the computer code and output, you will need to include some form of comment in your answer. This should be in the form of complete sentences that make sense to the reader.
- You should use a fixed space font such as courier for computer code and output, and something else for discussion.
- Question 1 does not carry any marks, but is **compulsory** as it enables us to check that your student number was actually used in an Octave (or MATLAB) session.
- There are 65 marks distributed as shown, and 65 marks = 100%.

QUESTION 1

Enter the following two commands, and copy and paste the output as your answer
¿ rand(”state”,student_number0915);
¿ rand(1)
where student_number0913 is your student number with ”0915” at the end and with ”-” removed. For example, if your student number is 123-456-7, you would enter
¿ rand(”state”,12345670916);
¿ rand(1)

QUESTION 2

The Suitcase Manufacturing Company produces a number of different types of suitcases of varying qualities, which are called S1, S2, S3, S4 and S5. The manufacturing process involves different departments in the factory, and we call these departments D1 to D6. Each suitcase requires time (in minutes) in the various departments as follows

	D1	D2	D3	D4	D5	D6
S1	10	15	10	12	5	5
S2	15	20	16	20	5	5
S3	21	25	20	20	8	8
S4	26	21	28	25	10	10
S5	33	28	30	29	15	15

The contribution of gross profit (i.e., the selling price less the cost of raw materialls) of each type of suitcase is given in the following table, which also shows the minimum number of each type of suitcase that must be produced together with the maximum number (in terms of contracts with retail stores)

	S1	S2	S3	S4	S5
Profit (Rands)	120	150	235	300	350
Minimum number	200	100	100	100	100
Maximum number	500	300	300	300	300

In addition, there is, this month, a supply limitation on the locks used on the higher quality suitcases (S3, S4 and S5), and the total production of these suitcases cannot exceed 600.

Each department can provide 24000 minutes per month, except Department D6, which can only offer 15000 minutes. How much of each product line should be produced so as to maximize the company's trding profit? [35]

QUESTION 3

Find the minimum value as well as the point at which the minimum occurs of

$$L = -2x_1 - 5x_2 + x_3$$

subject to the constraints

$$\begin{aligned} x_1 + 2x_2 - x_3 &\leq 6, \\ x_2 + 2x_3 &\leq 6, \\ 2x_2 + x_3 &\leq 4, \\ x_1, x_2, x_3 &\geq 0. \end{aligned}$$

[20]

QUESTION 4

Find the minimum value as well as the point at which the minimum occurs of

$$L = -2x_1 - 10x_2 + 27x_3 + 50x_4 + 32x_5$$

subject to the constraints

$$\begin{aligned}
x_1 + 2x_2 + x_3 + 1x_4 + 2x_5 &\leq 6, \\
x_2 + 2x_3 + 7x_4 - 3x_5 &\leq 6, \\
2x_2 + x_3 + 1x_4 - 2x_5 &\leq 4, \\
6x_1 + x_2 + x_3 + x_5 &\leq 16, \\
-2x_3 + 4x_4 + 9x_5 &\leq 30, \\
x_1, x_2, x_3, x_4, x_5 &\geq 0.
\end{aligned}$$

[25]

Total [80]

9 OTHER ASSESSMENT METHODS

There are no other assessment methods for this module.

10 EXAMINATION

Examination period

You will write the examination for this year module in October/November 2022. The supplementary exam will be written in January/ February 2023.

During the year, the Examination Section will provide you with information regarding the examination in general, examination dates and examination times. Please check on myUnisa and myLife email address for updates.

Examination admission
To be admitted to the examination you must submit the compulsory assignment, Assignment 01 before the due date.

CALCULATION OF FINAL MARK
Your final mark will be composed of 80% for your exam mark and 20% of your year mark.

Examination paper
The exam consists of a two hour paper. Note that you are **not allowed** to use a calculator in the exam.

Previous examination paper
Previous examinatioin papers are at times available on myUnisa to give you an idea of the format of the examination paper that you will write.

11 FREQUENTLY ASKED QUESTIONS

The *my Studies @ Unisa* brochure contains an A-Z guide of the most relevant study information.

12 SOURCES CONSULTED

No other sources were consulted in preparing this tutorial letter.

13 GETTING STARTED: INSTALLATION OF OCTAVE

This module is mainly about the use of the mathematical software package Octave or MATLAB, and in order to take the module it is a requirement that

- You have regular access to a computer, for example at home, at work, or at a Unisa computer laboratory
- If it is not your own (or Unisa's) computer, you have permission to install the software Octave or MATLAB onto it
- You have had some prior experience in computer programming.

Your study package contains a CD, and when you open the CD you will see that it contains the following directories, sub-directories and files

- StudyMaterial
  - TL501.pdf
  - TL101.pdf
- Octave
  - Windows
    - octave-3.0.0-setup.exe
    - octave-3.0.1-setup.exe
  - Linux
    - octave-3.0.0.tar
    - octave-3.0.1.tar
  - Mac
    - octave-3.0.0-i386.dmg
    - octave-3.0.1-i386.dmg
    - octave-3.0.1-ppc.dmg

We include both the latest (in August 2008) available version of Octave as well as the version (3.0.0) that was used in writing the Study Guide. You should install the latest version, but if you notice any discrepancies between the behaviour of this version and that described in the Study Guide, you could re-try with version 3.0.0. If you like, you can also go on the internet to see if there is an even later version of Octave. The Octave home page is http://www.octave.org, and the repository with various versions of Octave is http://www.gnu.org/software/octave/download.html

13.1 Windows

Our experience has been that the installation of Octave is easy and straightforward. Just insert the CD into your computer's CD drive, open it using Windows Explorer, and double click the .exe file you want to install. The installation window will open and unless you have experience in systems programming you should just accept the default options. The only exception is the page that asks you to choose a graphics backend. The default option is a development package based on java, but we have found that on some machines this option is unstable. So we suggest that you click on the stable version based on gnuplot and use that instead. It is as simple as that!

13.2 Linux and Mac

Versions of Octave for installation on a Linux or Mac machine are included on the CD, but your lecturers can provide only limited help if you experience system-related problems with these versions.

13.3 Unisa computer laboratories

If you are using a Unisa computer laboratory, you should find that Octave has already been installed and the Octave icon will be on the Desktop.

13.4 MATLAB

MATLAB is a commercial software product that has to be purchased, whereas Octave is available free of charge. Although there are occasional differences, the syntax of the two programming systems is almost identical. In some advanced, specialized applications we have found that MATLAB was able to solve a problem but Octave was unsuccessful. However, for the introductory purposes of this module, Octave is quite sufficient. If you wish, for example if the computer that you are using for this module already has MATLAB installed, then you are welcome to use MATLAB rather than Octave; but please be aware that there will be minor syntactical and layout differences between MATLAB and the notes in the Study Guide. Otherwise, we would suggest that you work entirely with Octave.

14 CONCLUSION

We hope that you will enjoy this module and we wish you success with your studies.

Your APM1513 lecturers