PITHAPUR RAJAH'S GOVERNMENT COLLEGE

An outcome based, NAAC accredited, green autonomous institution

4th Cycle NAAC accreditation grade: B++

Affiliated to Adikavi Nannaya University

Opp. Mc Laurin School, Raja Ram Mohan Roy Road, Kakinada 533001, Andhra Pradesh, India

E-mail: kakinada.jkc@gmail.com, Tel: 0884-2379480

DEPARTMENT OF MATHEMATICS

GUEST LECTURE ON

DIFFERENTIAL EQUATIONS USING MATLAB

15 NOVEMBER 2025

Principal's Permission Letter

Date: 12 NOV 2025

To
The Principal,
P.R. Govt.College (Autonomous),
Kakinada.

Respected Sir,

Sub: Request for permission to conduct a Guest Lecture on "Differential Equations using MATLAB" – Reg.

With due respect, we wish to bring to your kind notice that the **Department of Mathematics** is planning to organize a **Guest Lecture on " Differential Equations using MATLAB"** for the benefit of our I B.Sc. Mathematics Major students. The objective of this lecture is to provide students with an opportunity to gain practical exposure to solving differential equations using computational tools, enhancing their analytical and technical skills.

We are planning to invite **Smt.M.Madhavi, Lecturer in Mathematics, GDC,Tuni**, as the resource person for this session. The proposed date and time for the lecture are **15 NOV 2025 at 11.00 AM**, to be held at Ramanujan ICT Lecture Hall(Room No.45).

We therefore kindly request your gracious permission to conduct the above-mentioned guest lecture and to make the necessary arrangements. We assure you that all the required preparations will be done under the supervision of the department faculty, and a detailed report will be submitted after the successful completion of the event.

We look forward to your approval and support.

Thanking you,

Yours obediently,
G.Syam Prasad
Lecturer in Mathematics
Department of Mathematics
P.R. Govt.College(A)
Kakinada

Recommended and Forwarded by
In-Charge, Department of Mathematics

Principal
(Dr. K.Anjaneyulu)
P.R. Govt.College (Autonomous),
Kakinada

Circular / Notice

37

Notice 12 NOV 2025

The students of I B.Sc Mathematics major are here by informed that the department of mathematics organizing a Guest lecture on

"Differential Equations and their applications using MATLAB"

This lecture is aimed at enhancing students understanding of

→ solving ordinary differential equations using MATLAB
→ Introduction to MATLAB commands for D.E
→ understanding MATLAB's numerical solvers such as ode45, ode23, ode113.
→ Real-time applications of ~~Real~~ D.E in Engineering, physics and data Analysis
→ Demonstration of MATLAB live scripts

Resourse person : Smt. M. Madhavi
Lecturer in Mathematic
GDC, Tuni

Date and Time : 15 NOV 2025 @ 11.00 AM.

so all the students must assemble 10 minutes before the session begins and students are encouraged to bring a note book for taking important points. Also clarify your doubts during the interactive session.

Signature of the staff
1.
2.

Signature of the HOD

Relieving Letter

PITHAPUR RAJAH'S GOVERNMENT COLLEGE
An outcome based, NAAC accredited, green autonomous institution
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Affiliated to Adikavi Nannaya University
Opp. Mc Laurin School, Raja Ram Mohan Roy Road, Kakinada 533001, Andhra Pradesh, India
E-mail: kakinada.jkc@gmail.com, Tel: 0884-2379480

Date: 15 Nov 2025

To
Smt.M.Madhavi,
Lecturer in Mathematics,
Government Degree College,
Tuni.

Subject: Relieving Letter After Completion of Guest Lecture

Respected Madam,

This is to formally certify that you have successfully delivered the **Guest Lecture on "Differential Equations using MATLAB"** organized by the **Department of Mathematics, P.R.Govt.College(A),Kakinada**, on **15 Nov 2025**.

We sincerely appreciate your valuable time, efforts, and contribution in sharing your expertise with our students. Your session was insightful, well-structured, and greatly appreciated by the first year mathematics major students and faculty. Your valuable contribution enriched the academic environment and enhanced the understanding of the participants on the subject.

We extend our sincere gratitude for your cooperation and professionalism. The institution looks forward to inviting you again for future academic collaborations, seminars, or expert interactions.

We once again thank you for your support.

Received Copy
M. Madhavi 15/11/25

15/11/25
Principal,
(Dr.K.Anjaneyulu)
P.R.Govt.College(A)
Kakinada.

Brief Notes on Activity

In a guest lecture, **students get new perspectives and opinions that are often missed in a regular class**. A guest lecture gives students a better opportunity to learn about an explicit topic in a way that gets them involved in the class and actively join in a more convenient way of teaching.

Getting guest lecturers in college are very useful for some students but not for everyone. Guest lectures are a highly useful medium to provide exceptional knowledge to students, it also adds an extra variety to the classroom routine and colleges put a lot of emphasis on the importance of Guest lectures. The Guest lecturers are the "real-world" arriving in the classroom in order to make classes more interesting.

Guest speakers share their experiences and engage students in a dialogue. Dialogue with experts helps students to develop multiple skills like critical thinking, reasoning, planning for the future, etc.. There are multiple reasons to attend guest lectures at university and it is advised by every department to do so.

Guest lecturers can provide great benefits to the students and can be a great tool for the betterment of the class. In a guest lecture, students get new perspectives and opinions that are often missed in a regular class. A guest lecture gives students a better opportunity to learn about an explicit topic in a way that gets them involved in the class and actively join in a more convenient way of teaching.

The outcome of a Guest lecture also depends on the interest, willingness and motivation of the students. Some students seize the opportunity and start practising what they learn in lectures and build an advanced skillset which helps them in their future.

Why are guest lectures important?

Regardless of any course that you have selected, Guest lectures have multitudinous benefits. Students can learn more effectively and form a different perspective on things. One lecture cannot provide knowledge and guidance about everything, industry professional and subject matter expert's present varied perspectives.

Apart from this, let's further discuss the importance of guest lectures:

- ### Real-life world Exposure

Guest speakers make students aware of current business scenarios and situations. In a classroom students study about the concepts, however, guest speakers provide a broader view on the real-life problems faced by them in a particular niche and also presents solutions.

- ### Expert Professional

An expert guest speaker makes a big difference in students ability to understand any topic. By attending lectures from guest speakers students learn to overcome different challenges and it becomes easier to nail down difficult concepts.

Providing guest lectures is one of the most important teaching practice at PRGC(A). As we are in one of the worse pandemics of history, online classes are now a necessity and we are continuously organizing online guest lectures and online classes for students. Our state of the art LMS (learning management system) BLACKBOARD makes it easy for students to study in the comfort of their home.

- **Students get to speak with successful individuals**

Keynote speakers not only educate students about their journey towards success but also motivates them to achieve greatness. When students interact with successful entrepreneurs, alumni they learn the secrets of their struggles and by taking notes of their journey it also prepares them for the struggle that they may face in the path to success.

- **Inspiration for students**

Students follow regularly scheduled classes and sometimes it can feel a bit monotonous and boring. Guest lecture breaks monotony and updates students interest about career opportunities & career paths in new domains. Knowing about a better protective on future career sparks confidence and it inspires students to prepare not only theoretical concepts but also practicals which may not be included in the syllabus.

Hearing about changes being made in the working world with theoretical concepts is exciting and insightful for students. Students get to interact with a new teacher and also experience alternative ways of learning and teaching.

- **Clearer career path**

Students oftentimes look for mentors to answer important questions about their career options. Professors cannot answer all of these inquiries. The best individual to answer these questions is the experts already working in those specific fields.

Objectives of Guest Lecture

- To promote understanding via explanations of particularly difficult concepts.
- To respond to student misconceptions or difficulties.
- To create or engage interest in a new area.
- To add an extra variety to the classroom routine.
- To break monotony and to spark students' interest about career opportunities in new domains

Outcomes of Guest Lecture

- They can share their real-world experiences and challenges in their domain, and how they overcome them.
- This can help students to develop critical thinking and problem-solving skills.
- Students seize the opportunity and build an advanced skill set which helps them in their future.
- Students learn to overcome different challenges and it becomes easier to nail down difficult differential equations.

CV of Guest

Mail: madhavi.malireddy@asdgdcw.ac.inreddy@gmail.com
Mobile No: 09247380632

M. Madhavi- M.Sc (Mathematics),(Ph.D)

OBJECTIVE:

Seeking a challenging career in an esteemed organization and grow professionally by strengthening my skills and earn good reputation with whom I work, always keeping the goals of the Organization as the prime objective and to better facilitate the student learning in the area of the application of the mathematics in Engineering.

EXPERIENCE:

- **20 years teaching experiences in PG and Engineering Institutions.**

1. From Sept, 2021 to till date worked as a regular lecturer in **GDC(A), Tuni**
2. From June ,2018 to Sept,2021, worked as a regular lecturer in **ASDGDCW(A),Kakinada**
3. From August 2016 to July 2017, worked as an asst. Prof. in **AMC engineering college**, Bengaluru.
4. From July 2013 to May 2016 worked as Asst. prof. in **Gokaraju Rangaraju institute of engineering and technology**, Hyderabad .Ratified by JNTUH.
5. From July-2012 to July-2013 worked as Asst. Prof. in **BVRIT**, Hyderabad.
6. From September-2011 to June-2012 worked as Asst. Prof in **Vasavi College of Engineering College,** Ibrahimbagh, **Hyderabad.**
7. From May-2007 to May-2011 Worked as a Asst. Prof. in **RRS College of Engineering**, Hyderabad. Ratified by JNTUH.

- From August-2005 to April-2007 worked as a Lecturer in **Church Institute of Technology**, Hyderabad.
- From August-2003 to April-2005 Worked as a Part-Time P.G. Lecturer in KTRWC,Gudivada.Ratified by ANU, Guntur.

EDUCATIONAL PROFILE:

- **Qualified State Eligibility Test (SET) in the year 2012.**

Ph.D Registered from VIGNAN UNIVERSITY in "Fluid Dynamics".

Master of Mathematics

A.N.R. College, Gudivada Affiliated to ANU, Gudivada in 2003

B.A. (Maths, Stat., Economics)

A.N.R.P.L. Arts and Science College, ANU, Gudivada in 2001

Intermediate (M.P.C)

Sri Venkateswara Junior College, Gudivada, Board of Intermediate in 1998

Secondary School Certificate

S.G.R.K. High School, Gudivada, in 1996

SEMINARS ATTENDED:

Attended many workshops and seminars conducted by esteemed institutions to enhance the skills and knowledge.

Workshops Organized

Two national level workshops organized as a convener and acted as an organizing secretary for one national seminar.

(M. Madhavi)

Synopsis of the Lecture

DIFFERENTIAL EQUATION USING MATLAB

M.MADHAVI

LECTURER IN MATHEMATICS

GOVT. DEGREE COLLEGE(A),TUNI

ORIGIN OF DIFFERENTIATION

The word "differentiation" originates from the Latin word "differentiāre," which is derived from "differentia," meaning "difference" or "distinction." In mathematics, "differentiation" refers to the process of finding the derivative of a function, which measures the rate at which a quantity changes with respect to another. The concept of differentiation was developed in the 17th century, primarily by mathematicians such as Isaac Newton and Gottfried Wilhelm Leibniz. They independently developed methods for calculating derivatives to solve various problems in calculus and physics. Over time, the term "differentiation" has been adopted in various fields beyond mathematics, such as biology, economics, and education, to denote processes of distinguishing or specialized development. This broad usage reflects the fundamental idea of identifying and analyzing differences or changes in different contexts.

1. What is a differential equation

2. What is a linear differential equation

3. What is exact differential equation

TYPES OF DIFFERENTIAL EQUATIONS

- ORDINARY DIFFERENTIAL EQUATIONS
- PARTIAL ORDER DIFFERENTIAL EQUATIONS
- LINEAR DIFFERENTIAL EQUATIONS
- NON LINEAR DIFFERENTIAL EQUATIONS
- AUTONOMOUS DIFFERENTIAL EQUATIONS
- HOMOGENEOUS AND NON HOMOGENEOUS DIFFERENTIAL EQUATIONS
- EXACT AND NON EXACT DIFFERENTIAL EQUATIONS

Programme Schedule

DIFFERENTIAL EQUATIONS USING "MATLAB"

PITHAPUR RAJAH'S GOVERNMENT COLLEGE(A) : KAKINADA

ON

15.11.2025

M.MADHAVI,
LECTURER IN MATHEMATICS,
GOVERNMENT DEGREE COLLEGE,
TUNI

OUTLINE

1. Introduction to MATLAB
2. Interface of MATLAB
3. Differentiation and Integration of functions through MATLAB
4. Solving Differential equations by MATLAB

INTRODUCTION TO MATLAB

MATLAB stands for **MAT**rix **LAB**oratory.

It is a **high-level programming language and environment** developed by **MathWorks** for:

Numerical computation

Data analysis and visualization

Algorithm development

Simulation and modeling

It is widely used in **engineering, science, and applied mathematics**.

- **Inventor:** Cleve Moler
- **Year of creation: Late 1970s (around 1977–1984)**

Initially, MATLAB was just a **teaching tool** in universities.

Later, **Jack Little** and **Steve Bangert** collaborated with Cleve Moler.

In **1984**, they founded **MathWorks Inc.**, which commercialized MATLAB and developed it into the powerful environment we use today.

KEY FEATURES OF MATLAB

- **Matrix-Based Language:**

  Everything in MATLAB is treated as a matrix (even single numbers are 1×1 matrices).

- **Built-in Mathematical Functions:**

  Includes thousands of built-in functions for linear algebra, statistics, optimization, etc.

- **Visualization Tools:**

  Easy creation of 2D and 3D plots, graphs, and animations.

- **Toolboxes:**

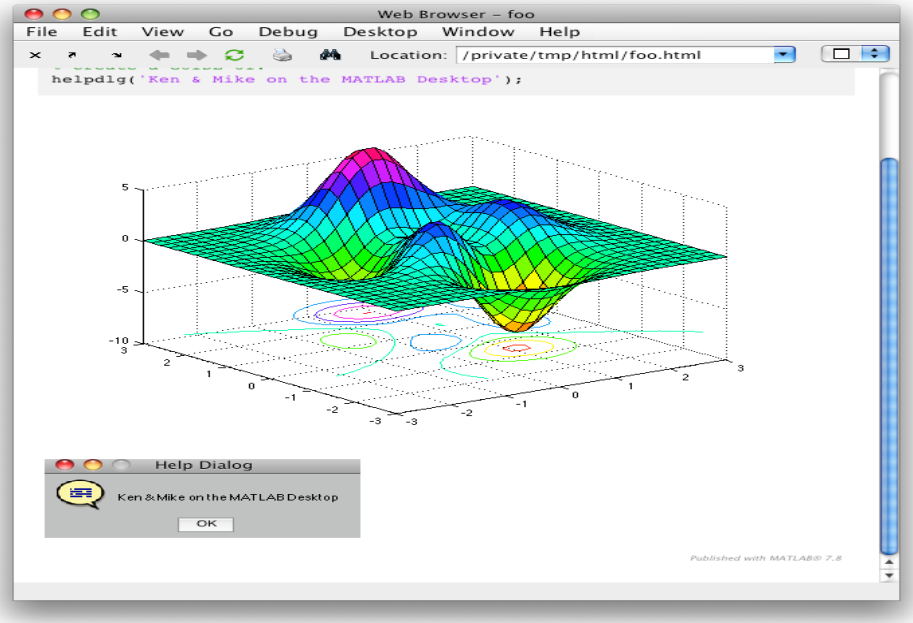
  Specialized add-ons for different areas, e.g.:

- Signal Processing Toolbox
- Image Processing Toolbox
- Control System Toolbox
- Machine Learning Toolbox

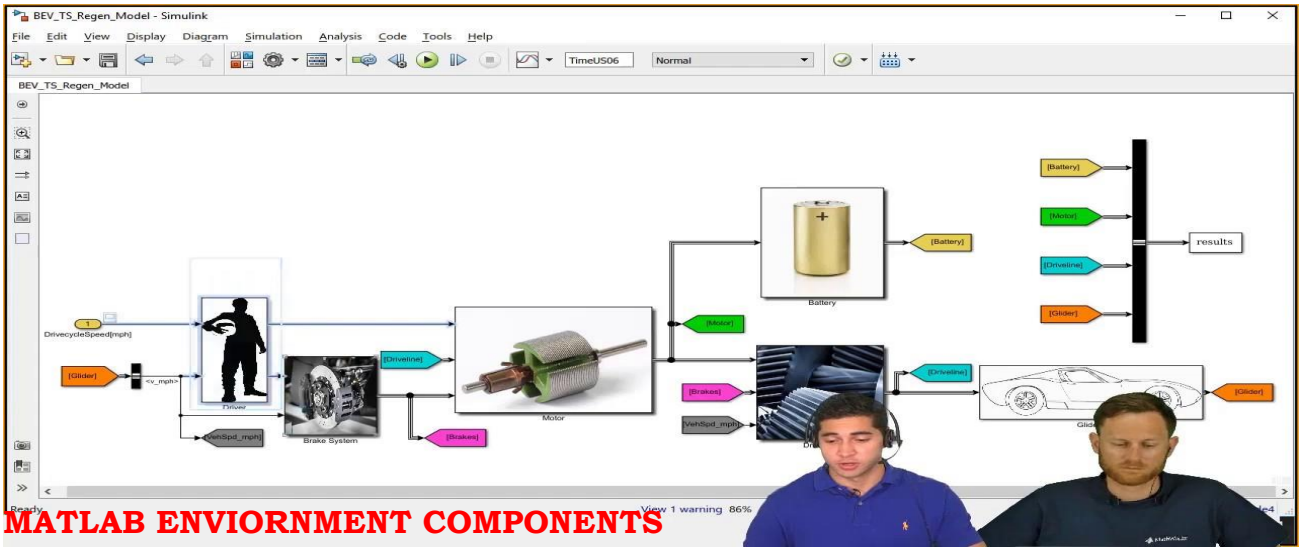
- **Simulink:**

  A graphical environment integrated with MATLAB for **model-based design and simulation** of dynamic systems.

PLOTTING OF A SURFACE USING MATLAB



SIMULATION USING MATLAB



MATLAB ENVIORNMENT COMPONENTS

- **Command Window:** For executing commands directly.
- **Workspace:** Shows the variables currently in memory.
- **Editor:** Used for writing and saving scripts (.m files).
- **Command History:** Keeps a record of executed commands.
- **Figure Window:** Displays plots and graphs.

Command Window:

The **main area** where you enter commands directly and view output.

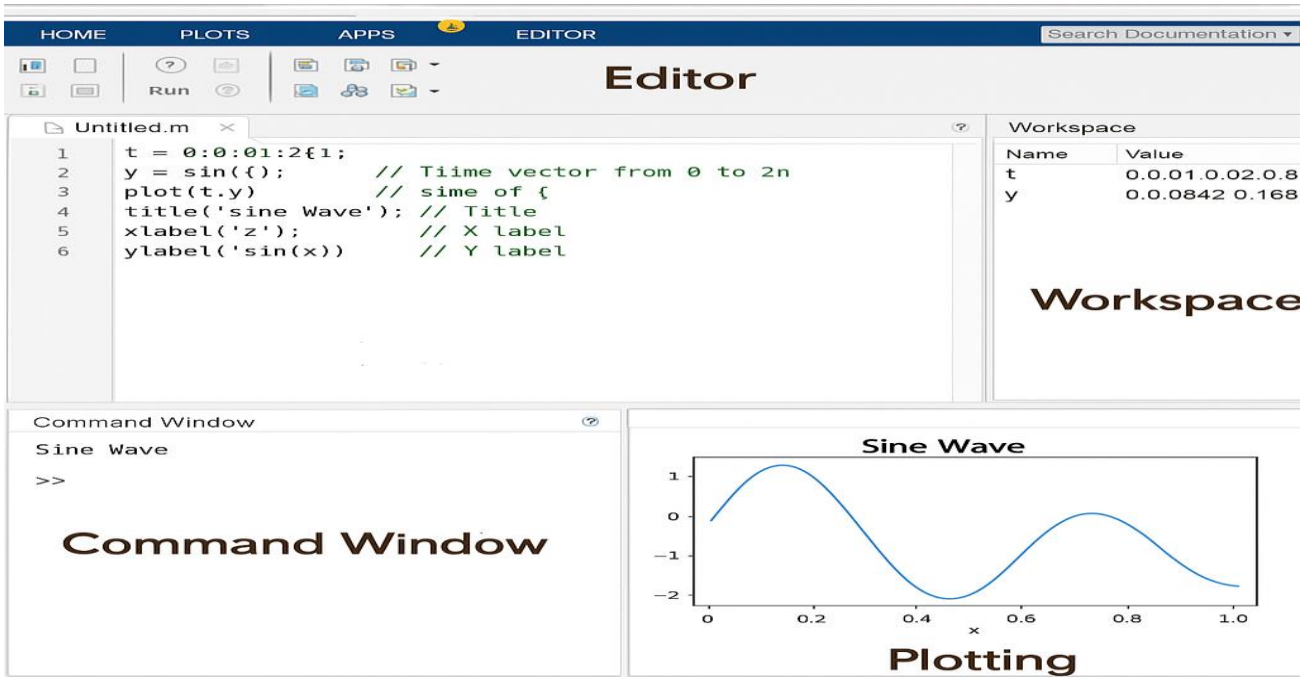
Acts like an **interactive calculator**.

- **Command History:**
- Stores a **list of all previous commands** typed in the Command Window.
- You can reuse or edit past commands easily by double-clicking them.
- Useful for keeping track of your work.

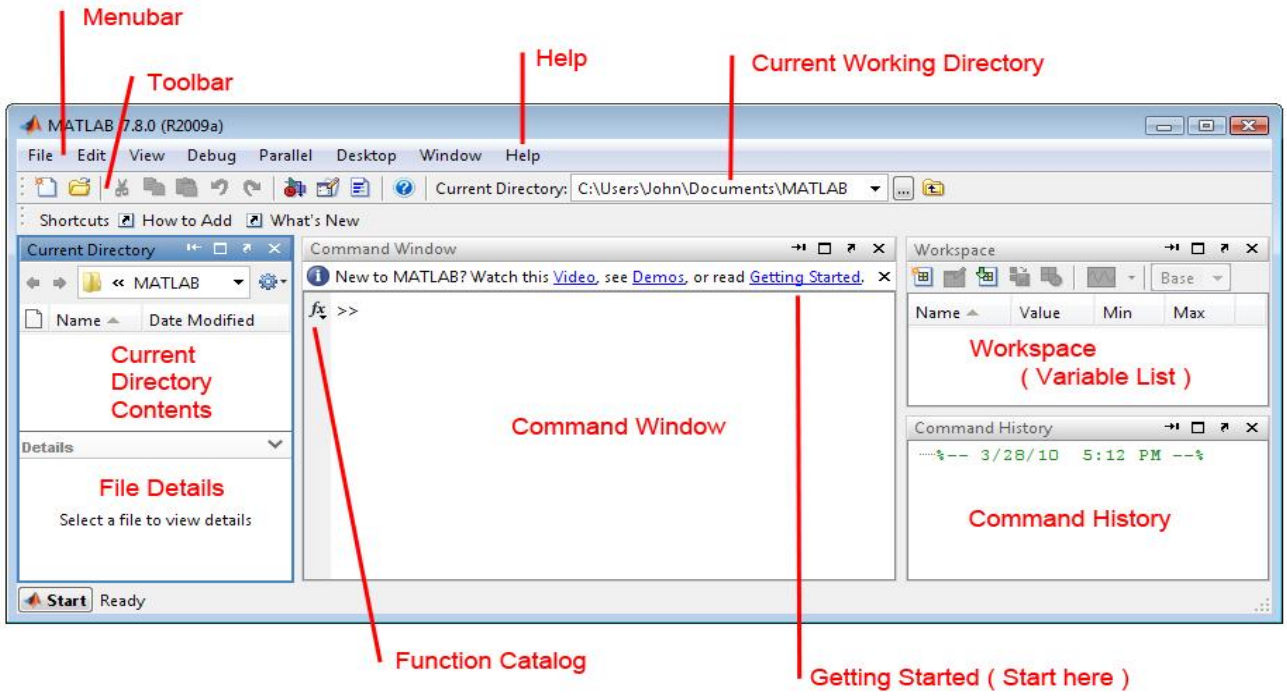
Editor:

- Used to **write, save, and run programs** (M-files or scripts).
- **Figure Window:**

- Displays **graphs, plots, and visualizations.**



The MATLAB Work Environment



MATLAB

>> a = 5

>> b = 10

>> c = a + b

C PROGRAMMING

```
#include <stdio.h>
int main() {
   int a = 5, b = 10, c;
   c = a + b;
   printf("Sum = %d", c);
   return 0;
}
```

LIMITATIONS OF MATLAB

Slower than compiled languages (like C)

Requires paid license

Not ideal for large-scale system programming

DIFFERENTIATION USING MATLAB

```
syms x
f = x^3 + 2*x^2 + 5*x + 7;
df = diff(f, x);
disp(df)
```

OUTPUT

```
3*x^2 + 4*x + 5
```

Syms

A **symbolic variable** is a variable that represents a **mathematical symbol** (like x, y, z) instead of storing a **numerical value**.

```
syms x
f = x^3 + 2*x^2 + 5*x + 7;
F = int(f, x);
disp(F)
```

OUTPUT

```
x^4/4 + (2*x^3)/3 + (5*x^2)/2 + 7*x + C
```

SOLUTION OF DIFFERENTIAL EQUATION BY MATLAB

The MATLAB code for solving above equation is

```
syms y(x)
eqn = diff(y, x) == x * y;
cond = y(1) == 1;
```

```
sol = dsolve(eqn, cond);
disp('The solution is:');
disp(sol);
y =
1/exp(1/2)*exp(1/2*x^2)
```

Solution of higher order Equations:

Syntax for solution of higher order equation is with the initial and boundary conditions is

dsolve('eqn','cond1', 'cond2',…)

Example: Solve

The MATLAB code for above differential equation is

PROGRAMME SHEET

INVITING GUESTS ON TO THE DAIS	: 11:00 am
	Smt.K.Samrajyam
OPENING REMARKS OF H.O.D	: Dr. K. Jayadev
	HOD of the Department
GUEST INTRODUCTION	: Smt.K.Samrajyam
MESSAGE OF THE CHIEF GUEST	: 11.15 to 11.30
LECTURE CLASS OF THE GUEST	: 11.30 AM to 1.00 PM
FELICITATION OF CHIEF GUEST	: HOD, Staff Members & Students
FEEDBACK ON PROGRAMME	: 1. P.SARALA
	2. G.HEMA SRI
	3. J.VAMSI VENKAT

List of the participants with signatures

229

Guest Lecture. 15/11/2025

The department of Mathematics conducted a Guest Lecture on 15-11-2025 at 11.00AM on Differential equations Uses in Matlab by Smt. M. Madhavi, Lecturer in Mathematics in Govt Degree College, Tuni.

Madhavi madam told about differential equations how to use, how to apply in matlab, given many examples for many applications to the first year mathematics major students.

M. Madhavi 15/11/2025
Signature of the Guest Lecture.

Signature of the H.O.D.

Signature of the Lecturers.
1. Shyam prasad
2.
3. K.S.L. Roja
4. CSSRBhanu
5. K. So 15/11

SNO.	Name of the student.	Major.	Signature.
1.	P. sarala	I B.Sc maths	P. Sarala
2.	S. Renuka	I B.Sc Maths	S. Renuka.
3.	K. Anusha Sri	I B.Sc Maths	K. Anushasri
4.	P. Dhana lakshmi	I B.Sc maths	P. Dhana
5.	Y. Satya vani	I B.Sc maths.	Y. satya vani
6.	B. Chandra	I. Bsc Maths	B. Chandra.
7.	G. Hema Sai	I. Bsc maths	G. Hemasai
8.	R. Sri lalitha Rani	I BSC Maths	R. Sri lalitha Rani
9.	L. Srinu Vasanthi	I B.Sc maths	L. Srinu Vasanthi
10.	L. Ramu	I BSc [Maths]	L. Ramu
11.	B. Lova sri	I BSc (maths)	B. Lovasri
12.	ch. Bhagya lalitha	I B.Sc (maths)	ch. Bhagya lalitha
13.	E. Durga devi	I B.Sc (Maths)	E. Durga devi
14.	N. Sarvani	I B.Sc (Maths)	N. Sarvani
15.	K. Tanuja	I Bsc (Maths)	K. Tanuja
16.	P. Susmitha	I BSC (Maths)	P. Susmitha.
17.	T. Lakshmi Tulasi	I Bsc (Maths)	T. Lakshmi Tulasi
18.	D. Abhinash Gangadhar	I Bsc (Maths)	D. Abhinash
19.	K. V. V. I. vinay	I BSC (Maths)	K. Vinay
20.	K. yasvanth kumar	I Bsc (Maths)	
21.	K. Pavan Sai	I BSC (Maths)	K. Pavan Sai
22.	K. Bangaru naidu	I B.Sc (Maths)	K. Bangaru naidu
23.	D. veeramanikanta	I D.Sc (maths	D. veeramanikanta.
24.	V. Hema Venkat	I B.Sc (maths)	V. Hema venkat
25.	I. umamaheswar	I st B.Sc maths	Uma.
26	ch. Simhadri	I st B.S.C maths	ch. Simhadri
27	M. Raju.	I st B.Sc maths	M. Raju
28	B. Ramakrishna	I st BSC Maths	B. Ramakrishna
29)	S. Pavan kumar	1 st BSC. maths	S. Pavan
30)	K. Sai durga Prasad	1 st BSC. maths	K. Sai durga prasad

S.NO.	Name of the student	Major	Signature
31)	B.S.S. Nayakar	1st BSC Maths	B S S Nayakar
32)	P. Durga Sankar	1st BSC math	P. Durga Sankar
33)	N Naga APparao	1st BSC Maths	N. N. APparao
34)	K. Veera Durga Prasad.	1st Bsc Maths	K. V. Durga Prasad.
35)	CH. Hari Bhargav Kasthik	1st BSC Maths	CH. H B. Kasthik
36	P. Teja Sai	1st BSC maths	P Teja Sai

Student Feedback

Guest Lecture Feedback		
Topic: Differential Equations using MATLAB		
Delivered by : Smt.M.Madhavi		Date : 15-11-2025
Please rate the following on the scale of 1-5, with 5 being the highest & 1 being the lowest		
S.No		1 to 5
1	Topic of the Speaker was relevant to my area of interest	
2	Speaker was able to explain the topic clearly & used relevant examples.	
3	Speaker was able to make the lecture interactive & made me feel engaged.	
4	Speaker was able to positively influence my views towards applications of differential equations.	
5	In near future, I would like to attend more lectures from the same Speaker.	Yes /No
6	Kindly put forward suggestions/comments(if any)	

Report:

Kindly put forward suggestions/comments(if any)

- Good taught
- No comments l don't have learn this type of classes from my past .this is too refreshing for me.
- Good lecturer skills
- Nice lecture
- Thanking you for comming madam
- Very good lecturer
- Good
- Good lecturer &good teaching skills
- Very useful lecture for us
- Necessary
- This concept is very nice
- Good lecturer
- Good explanation
- Good teacher
- Speak slowly
- Good performance
- No Comments

Pics Clips


WELCOME
P.R. GOVERNMENT COLLEGE OF AUTONOMOUS
KAKINADA
An Autonomous Institution & NAAC Accredited with "A" Grade (CGPA 3.17)
DEPARTMENT OF MATHEMATICS
GUEST / INVITED LECTURE
DATE :
GPS Map Camera
Google
Kakinada, Andhra Pradesh, India
X65j+32c, Raja Rammohan Roy Road, Near Government General Hospital, Rama Rao Peta, Kakinada, Andhra Pradesh 533001, India
Lat 16.957829° Long 82.229834°
Saturday, 15/11/2025 11:43 AM GMT +05:30


WELCOME
DEPARTMENT OF MATHEMATICS
P.R. GOVT. COLLEGE (A)
KAKINADA
GPS Map Camera
Google
Kakinada, Andhra Pradesh, India
X65j+32c, Raja Rammohan Roy Road, Near Government General Hospital, Rama Rao Peta, Kakinada, Andhra Pradesh 533001, India
Lat 16.957875° Long 82.229858°
Saturday, 15/11/2025 11:44 AM GMT +05:30


WELCOME
DEPARTMENT OF MATHEMATICS
P.R. GOVT. COLLEGE (A)
KAKINADA
GPS Map Camera
Google
Kakinada, Andhra Pradesh, India
X65j+32c, Raja Rammohan Roy Road, Near Government General Hospital, Rama Rao Peta, Kakinada, Andhra Pradesh 533001, India
Lat 16.957873° Long 82.229849°
Saturday, 15/11/2025 11:45 AM GMT +05:30

Lecture Classes

Felicitation by Chief Guest

Conclusion:

The guest lecture by Smt.M.Madhavi on Differential Equations & It's Real life applications was an enlightening experience for the students of Pithapur Rajah's Government college(A), Kakinada. The event not only provided a comprehensive understanding of the Differential Equations but also inspired students to equip themselves with the necessary skills and knowledge. The Department of Mathematics

extends its sincere appreciation to Dr.K.Jayadev, In charge of the department and all staff members for their collaborative efforts in organizing this enlightening session, which will undoubtedly empower and guide students towards success in their future endeavors.