



# Unit 3 - UNIT - III : Numerical Solutions of ODE

Course outline

<div><div>UNIT - I :</div><div>Transcendental Polynomial &amp; Simultaneous equations and Interpolations ()</div></div>
<div><div>UNIT - II :</div><div>Numerical differentiation and Integration ()</div></div>
<div><div>UNIT - III :</div><div>Numerical Solutions of ODE ()</div><div><div>Lecture 1: Solution by Taylor series- First order ODE (week 7) (unit? unit=34&amp;lesson=35)</div><div>Lecture 2 Solution by Taylor's series - Second and simultaneous ODEs (week 7) (unit? unit=34&amp;lesson=36)</div><div>Lecture 3-Solution of Second order and Simultaneous ODE by Taylor's series method(contd..)(Week 7) (unit? unit=34&amp;lesson=37)</div><div>Quiz: Assessment – 7 (assessment? name=45)</div><div>Lecture 4 Solution of First order ODE by Picard's Method (Week 8) (unit? unit=34&amp;lesson=38)</div><div>Lecture 5 :Solution by Picard's method (contd) (week 8) (unit? unit=34&amp;lesson=39)</div><div>Lecture 6 -Solution by Euler's method – Improved and modified</div></div></div>

## Assessment -- 9

The due date for submitting this assignment has passed.

Due on 2023-05-21, 23:59 IST.

As per our records you have not submitted this assignment.

- 1) The number of initial values required for Milne's method

four

three

one

two

No, the answer is incorrect.  
Score: 0  
Accepted Answers:  
four

1 point
- 2) The error in Runge-Kutta second order method is of order

square of h

cube of h

h

1.63

No, the answer is incorrect.  
Score: 0  
Accepted Answers:  
cube of h

1 point
- 3) Advantages of Runge-Kutta method

Derivatives are required

easy for computation

derivatives are not required

none of the above

No, the answer is incorrect.  
Score: 0  
Accepted Answers:  
derivatives are not required

1 point
- 4) If  $f(x,y)=f(x)$  in a differential equation, in the Runge Kutta method of fourth order  $\Delta y$

reduces to area by Simpson's three eight rule

reduces to area by trapezoidal rule

reduces to area by Picard's rule

reduces to area by Simpson's one-third rule

No, the answer is incorrect.  
Score: 0  
Accepted Answers:  
reduces to area by Simpson's one-third rule

1 point
- 5) Which of the following methods does not require starting values

Euler's method

Milne's method

Adam's method

Multi step methods

No, the answer is incorrect.  
Score: 0  
Accepted Answers:  
Multi step methods

1 point
- 6) Runge-Kutta method of second order is the - - - - method

1 point

Euler method (week 8)  
(unit?  
unit=34&lesson=40)

Lecture 7 - Solution by  
Euler's method –  
Improved and modified  
Euler method(cont..)  
(Week 8) (unit?  
unit=34&lesson=41)

Quiz: Assessment – 8  
(assessment?  
name=47)

Lecture 8 : Runge kutta  
method for solving First  
order ODE and Second  
order ODE (week 9)  
(unit?  
unit=34&lesson=42)

Lecture 9-Runge- Kutta  
Method (contd..)(Week  
9) (unit?  
unit=34&lesson=43)

Lecture 10: Predictor -  
Corrector Methods  
(Milne's Method) (Week  
9) (unit?  
unit=34&lesson=44)

Quiz: Assessment – 9  
(assessment?  
name=49)

**UNIT - IV :**  
**Statistical**  
**distributions and**  
**Test of hypothesis**  
**()**

**Unit V : Non-**  
**parametric**  
**statistical**  
**methods & Time**  
**series analysis ()**

- ☐ Euler's method  
☐ Taylor's method  
☐ midpoint method  
☐ none of these

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
*midpoint method*

7) For  $y' = y + x$  with  $y(0) = 1$  and  $h = 0.1$  the value of  $K_1$  in Runge-Kutta fourth order method is - -

- ☐ 0.1  
☐ 1.0  
☐ 0.01  
☐ 0.11

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
*0.1*

8) In Runge-Kutta fourth order method  $K_4 = - - - -$

- ☐  $hf(x_1 + h, y_1 + K_3)$   
☐  $hf(x_1 + h, y_1 + K_2)$   
☐  $hf(x_1 + h, y_1 + K_1)$   
☐  $f(x_1 + h, y_1 + K_3)$

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
 *$hf(x_1 + h, y_1 + K_3)$*

9) Find  $y(1)$  by Milne's method, given that  $y' = x - y^2$ ,  $y(0) = 0$ ,  $y(0.2) = 0.02$ ,  $y(0.4) = 0.0795$ ,  $y(0.6) = 0.1762$ .

- ☐ 0.5546  
☐ 0.4556  
☐ 0.4654  
☐ 0.6654

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
*0.4556*

10) By Runge-Kutta method solve  $y' = y^2 + xy$ ,  $y(1) = 1$ . find  $y(1.1)$ .

- ☐ 1.4  
☐ 1.2145  
☐ 1.2415  
☐ 1.425

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
*1.2415*

11) By Milne's method solve  $y' = 1 + y^2$ ,  $y(0.6) = 0.6841$ ,  $y(0.4) = 0.4228$ ,  $y(0.2) = 0.2027$ ,  $y(0) = 0$ . find  $y(-0.2)$ .

- ☐ -0.02  
☐ -0.3  
☐ -0.2028  
☐ 0

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
*-0.2028*

12) Milne's method is a

- ☐ single step method  
☐ Multistep method  
☐ series method  
☐ none of the above

No, the answer is incorrect.  
Score: 0

Accepted Answers:  
*Multistep method*

13) Obtain the values of  $y$  at  $x = 0.1$  and  $0.2$  using R-K fourth order for the differential equation  $y' = -y$ , given  $y(0) = 1$ .

- ☐  $y(0.1) = 0.905$ ,  $y(0.2) = 0.8187$   
☐  $y(0.1) = 0.95$ ,  $y(0.2) = 0.887$   
☐  $y(0.1) = 0.91$ ,  $y(0.2) = 0.81$

1 point

1 point

1 point

1 point

1 point

1 point

1 point

☐  $y(0.1) = 0.9, y(0.2) = 0.8$

No, the answer is incorrect.

Score: 0

Accepted Answers:

$y(0.1) = 0.905, y(0.2) = 0.8187$

14) Using R – K fourth order find  $y(0.8)$  correct to 4 decimal places, if  $y' = y - x^2, y(0.6) = 1.7379$

1 point

☐ 2.1

☐ 2.0145

☐ 2.451

☐ 2.5401

No, the answer is incorrect.

Score: 0

Accepted Answers:

2.0145

15) Using R-K fourth order find  $y(0.2)$ , given that  $y' = y - x, y(0) = 2$  taking  $h = 0.1$ .

1 point

☐ 2.4

☐ 2

☐ 2.421

☐ 1.242

No, the answer is incorrect.

Score: 0

Accepted Answers:

2.421



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