ations

$\chi^2 + 2\chi + 1 = 0$	Algebric Equation (Polynomial	Equation]
1		
$\frac{dy}{dx} + x = 0$	Differential Equation	
dx 		
$\frac{dy}{dx} + \sin x = 0$	Differential Equation	
dx		
Sinx+X=0	Trignometric Equation	
	or [Transidential Equation]	
xdy + ydx =0	Differential Equation	27
0 0		
$\frac{\chi + \frac{1}{\chi} = 0}{\chi}$	Non-Polynomial	**
χ		

Definition

An equation involving derivatives or	
differentials of one or more dependent variables	1 1
w.r.t one or more independent variables: is	
called Differential Equation.	

Types

Ordinary Differential -	Partial Differential Equation
Equation	This Differential Equation
This D.E have derivatives	have derivatives wiret
with one/single Independent	more than one Independent
variables.	avariables.
$\frac{d^2y}{dx^2} + \frac{dy}{dx} + y = 0$	$d^2u + du = 0$
d x dx	dx^2 dt
Same Independent Variables.	pifferent Independent variables
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Differential Equations	. 0	rder	Degree
Order Degree			
Differential Equations $\frac{\frac{d'}{dx}y' + y = 0}{\frac{d'}{dx}y' + y}$		1	1
- (dx)			
$\left(\frac{d}{dx}y\right)^2 + y = 0$		1	2
C •			(
$\frac{d^2y}{dx^2} + \frac{dy}{dx} + y = 0$		2	1
$\frac{d^2y}{dx^2} + \left(\frac{dy}{dx}\right)^3 + y = 0$		2	1
ο() ²			1
# Highest Order Derivative	es involv	es Deg	ree of
<u>Differential Equation</u> .			
Degree of the High	est vari	iable	after
the Differential Eq			
made free from F	ladical f	Practions	•
	.1.		(
Linear Differential Equations [L.D.E]			
	fu.	L.D.E)	
Dependent variable [D.V] $dy + y = 0$, d,2	+ 1/ - /	
dx independent variable [1.v	(dx)	+y=0	
Sinaependent whatere its	-	6.7	
$[I.V] \leftarrow x. dy + y = 0$	D.Ve-y. dy	+ Y = 0	
dX	dx	7	
* An Equation have maximum	≱An (suation	having maximum
of only one degree.	degree		more than 2.
No Products of Dependent	* Prodi		Dependent :
variable and derivatives	varial	ole and	. derivatives
Occurs.	DCCUY		HERO

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Mon	Tue	Wed	Thu	Fri	Sat	Sun
0	0	0	0	\circ	0	0

Date:____

	Date:
Autonomous Equation	Non-Autonomous Equation
$\frac{d}{dy} = 1 + y^2$	dy = 2xy
$\frac{d}{dx}y = 1 + y^{2}$ (D.v) is on Right side.	$\frac{dy = 2xy}{dx}$ (I.v) is on Right Side.
$\frac{d}{d}y = y - y^2$	d ,, - r
$\frac{d}{dx}y = y - y^2$ (p.v) is on Right side.	$\frac{d}{dx} y = x$ [1.v] is on Right Side.
	,
Difference between +	lomogeneous and non
Homogeneous Differential	
• • • • • • • • • • • • • • • • • • • •	···
· ·	1
Homogeneous D. E	Non Homogeneous D.E
Homogeneous D. E * Term wise Power same	Non Homogeneous D.E * Term wise Power same
* Term wise Power same	* Term wise Power same
Term wise Power same R.H.S = 0 T.W.P=2 T.W.P=2 R.H.S = 0	★ Term wise Power same but R.H.S ≠ 0
Term wise Power same R.H.S = 0 T.W.P=2 T.W.P=2 R.H.S = 0	★ Term wise Power same but R.H.S ≠ 0 ★ Of R.H.S=0 then Term
Term wise Power same R.H.S = 0 T.W.P=2 T.W.P=2 R.H.S = 0 $\chi^2 + 2\chi y' + y' = 0$	★ Term wise Power same but R.H.S ≠ 0 ★ Of R.H.S=0 then Term wise power is not same
Term wise Power same R.H.S = 0 T.W.P=2 T.W.P=2 R.H.S = 0	★ Term wise Power same but R.H.S ≠ 0 ★ Of R.H.S = 0 then Term wise power is not same ★ Different term wise power
Term wise Power same R. H. S = 0 T.W.P=2 $x^2 + 2xy' + y^2 = 0$ $x^2 + 2xy' + y^2 = 0$ R.H.S=0.	★ Term wise Power same but R.H.S ≠ 0 ★ Of R.H.S = 0 then Term wise power is not same ★ Different term wise power
Term wise Power same R. H. S = 0 T. W. P=2 $\chi^2 + 2\chi y' + y'^2 = 0$	★ Term wise Power same but R.H.S ≠ 0 ★ Of R.H.S=0 then Term wise power is not same ★ Different term wise power
Term wise Power same R. H. S = 0 T. W. P=2 $\chi^2 + 2\chi y' + y^2 = 0$ $\chi^2 + 2\chi y' + y^2 = 0$ R. H. S = 0 $\chi^2 + 2\chi y' + y^2 = 0$ Thus = 2 $\chi^2 + 2\chi y' + y = 0$ Thus = 2 $\chi^2 + 2\chi y' + y = 0$ Thus = 2 $\chi^2 + 2\chi y' + y = 0$ Thus = 2 $\chi^2 + 2\chi y' + y = 0$ Thus = 2 $\chi^2 + 2\chi y' + y = 0$ Thus = 2 $\chi^2 + 2\chi y' + y = 0$ Thus = 2 $\chi^2 + 2\chi y' + y = 0$ Thus = 2 $\chi^2 + 2\chi y' + y = 0$ Thus = 2 $\chi^2 + 2\chi y' + y = 0$ Thus = 2 $\chi^2 + 2\chi y' + y = 0$ Thus = 2 $\chi^2 + 2\chi y' + y = 0$ Thus = 2 $\chi^2 + 2\chi y' + y = 0$ Thus = 2 $\chi^2 + 2\chi y' + y = 0$ Thus = 2 $\chi^2 + 2\chi y' + y = 0$ Thus = 2 $\chi^2 + 2\chi y' + y = 0$ Thus = 2 $\chi^2 + 2\chi y' + y = 0$	Term wise Power same but R.H.S ≠ 0 Consider the power same Different term wise power and R.H.S ≠ 0 TMP=2 T.WP=1 R.H.S=0 2²+2x=0 R.H.S ≠ 0 R.H.S ≠ 0
Term wise Power same R.H.S = 0 T.W.P=2 $x^2 + 2xy' + y^2 = 0$ T.W.P=2 $x^2 + 2xy' + y^2 = 0$ R.H.S=0 $x^2 dy + y(x+y)dx = 0$ Term wise power are same and R.H.S is	Term wise Power same but R.H.S ≠ 0 Construction but R.H.S = 0 then Term wise power is not same Different term wise power and R.H.S ≠ 0 TMP=2 T.WP=1 R.H.S=0 1 1 1 x²+2x=0
Term wise Power same R. H. S = 0 T. W. P=2 $\chi^2 + 2\chi y' + y^2 = 0$ $\chi^2 + 2\chi y' + y^2 = 0$ R. H. S = 0 $\chi^2 + 2\chi y' + y^2 = 0$ Thus = 2 $\chi^2 + 2\chi y' + y = 0$ Thus = 2 $\chi^2 + 2\chi y' + y = 0$ Thus = 2 $\chi^2 + 2\chi y' + y = 0$ Thus = 2 $\chi^2 + 2\chi y' + y = 0$ Thus = 2 $\chi^2 + 2\chi y' + y = 0$ Thus = 2 $\chi^2 + 2\chi y' + y = 0$ Thus = 2 $\chi^2 + 2\chi y' + y = 0$ Thus = 2 $\chi^2 + 2\chi y' + y = 0$ Thus = 2 $\chi^2 + 2\chi y' + y = 0$ Thus = 2 $\chi^2 + 2\chi y' + y = 0$ Thus = 2 $\chi^2 + 2\chi y' + y = 0$ Thus = 2 $\chi^2 + 2\chi y' + y = 0$ Thus = 2 $\chi^2 + 2\chi y' + y = 0$ Thus = 2 $\chi^2 + 2\chi y' + y = 0$ Thus = 2 $\chi^2 + 2\chi y' + y = 0$ Thus = 2 $\chi^2 + 2\chi y' + y = 0$	Term wise Power same but R.H.S ≠ 0 Consider the power same Different term wise power and R.H.S ≠ 0 TIMP=2 T.W.P.I R.H.S=0 2²+2x=0 R.H.S ≠ 0
Term wise Power same R.H.S = 0 T.W.P=2 $x^2 + 2xy' + y^2 = 0$ T.W.P=2 $x^2 + 2xy' + y^2 = 0$ R.H.S=0 $x^2 dy + y(x+y)dx = 0$ Term wise power are same and R.H.S is	Term wise Power same but R.H.S ≠ 0 Consider the power same Different term wise power and R.H.S ≠ 0 TIMP=2 T.W.P.I R.H.S=0 2²+2x=0 R.H.S ≠ 0

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Date:_

$$y = \sqrt{\frac{dy}{dx}} + \frac{\kappa}{dy} \frac{dy}{dx}$$

$$y - \sqrt{x} \left(\frac{d}{dx} y \right) = K$$
 $\frac{dy}{dx}$

$$K = y \cdot \frac{dy}{dx} - Jx \left(\frac{d}{dx}y\right)^2$$

Differential Equation;

ordinary Differential Equation

Order = 1

Non-Linear Differential Equation

$$\left(y - \chi \, dy\right)^2 = \left(a\left(1 + \left(\frac{dy}{dx}\right)^2\right)^{\frac{1}{2}}\right)^{\frac{1}{2}}$$

$$\frac{y^2 + \chi^2 \left(\frac{d^3 y}{d \chi^2} \right)^2 - 2 \chi y \frac{d y}{d \chi} = \alpha^2 \left(1 + \left(\frac{d y}{d \chi} \right)^2 \right)$$

Differential Equation

Ordinary Differential Equation

Non-Linear Differential Equation

Order =1

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