## University of Jijel - Faculty of exact sciences and computer science -Mathematics department

## Series No. 03 Analysis 02

2023/2024

Exercise 01: Solve the following differential equations and determine their type:

1) 
$$(x^2 + 1)y' = y^2 + 1$$
,

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, 2)  $(3y + x)dx - (3x + y)dy = 0$ ,

3) 
$$xy' + y(x+1) = e^x$$
,

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, 4)  $y' + y \tan x = \sin 2x$ , with  $y(0) = 1$ ,

5) 
$$xyy' = y^2 - x(x - y)$$
,

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, 6)  $(y + x - 3)dx + (x - y - 1)dy = 0$ ,

7) 
$$(2x-3)y' = x + 2y + 1$$
, 8)  $y' = e^{x}y^{2} - 2y$ ,

8) 
$$y' = e^x y^2 - 2y$$

9) 
$$y' = xy(x^2y^2 - 1)$$
,

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, 10)  $y' \sin x = y \ln x$ , avec  $y\left(\frac{\pi}{2}\right) = e$ ,

11) 
$$y' + y^2 - 2y \sin x + \sin x^2 - \cos x = 0$$
, where  $y = \sin x$  is a particular solution.

Exercise 02: Solve the following differential equations and determine their type:

1) 
$$v''+2v'+v=0$$
.

1) 
$$y''+2y'+y=0$$
, 2)  $y''-y'+2y=0$ , with  $y(0)=1$  and  $y'(0)=-1$ ,

3) 
$$y''+3y'+2y=0$$
,

3) 
$$y''+3y'+2y=0$$
, 4)  $y''+4y'+3y=3(x^2+1)$ , with  $y(0)=1$  and  $y'(0)=-1$ ,

5) 
$$y'' - 2y' + 5y = 2\sin x \cos x$$
,

6) 
$$y'' + 4y' + 3y = (x^2 + 1)e^x$$
,

7) 
$$y'' - 4y' + 3y = 3x + 2 + 4e^x + 5e^{-x}$$
, 8)  $y'' - 2y' = e^x \sin x$ .

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