

Lecture 5B

$$\frac{dy}{dx} = f(x,y)$$

$$\frac{dy}{dx} = x^3 + 2xy^2$$

$$= f(x,y)$$

$$f(x,y) = x^3 + 2xy^2 + y$$

$$f_x = 3x^2 + 2y^2$$

$$f_y = 4xy + 3y^2$$

$$f_{xx} = 6x$$

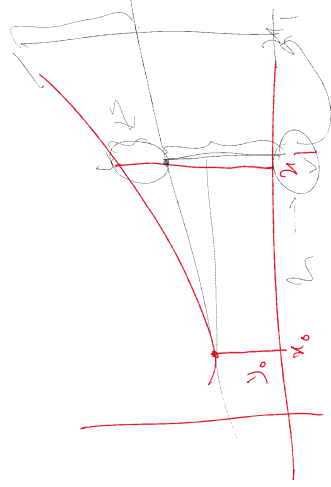
$$f_{xy} = 4y + 6y$$

$$f_{yy} = 4y$$

$$y(x_0+h) = y(x_0) + hf +$$

$$y(x_0+h) = y(x_0) + hf +$$

$$= 1.3385$$



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$$y^3, \quad y(0)=1 \quad \text{at } x=0.2$$

$$x_0=0 \quad y_0=1$$

$$f = 1$$

$$f_x = 2$$

$$f_y = 3$$

$$f_{xy} = 4$$

$$f_{xx} = 6$$

$$f_{yy} = 6$$

(0,1)

$$(x_0, y_0) + \frac{h^2}{2!} [f_{xx} + f_{yy}] (x_0, y_0)$$

$$(x_0, y_0) + \frac{h^3}{3!} [f_{xxx} + 2f_{xyx} + f_{yyy} + f_{xxy} + f_{xyy} + f_{yxy} + f_{yyx}] (x_0, y_0)$$

$$= 1.3385$$