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Assignment -1

Sol: 1(a) Taylon series expansion for a function f(x) at $x \ge 0$ is given by:

$$f(x) = \sum_{n=0}^{\infty} f_{n}(0) \cdot x^{n} \longrightarrow 0$$

Let's make a table for the function till 3rd order des derivative:

$$f(x) = e^{x} \implies f'(0) = e^{0} = 1
 f'(x) = e^{x} \implies f'(0) = e^{0} = 1
 f''(x) = e^{x} \implies f''(0) = e^{0} = 1
 f'''(x) = e^{x} \implies f'''(0) = e^{0} = 1$$

$$f^{n}(0) = e^{2} \implies f^{n}(0) = e^{0} = 1.$$

For a nth degree taylor polynomial $f^{n}(o) = 1$. Using this value in Ω ,

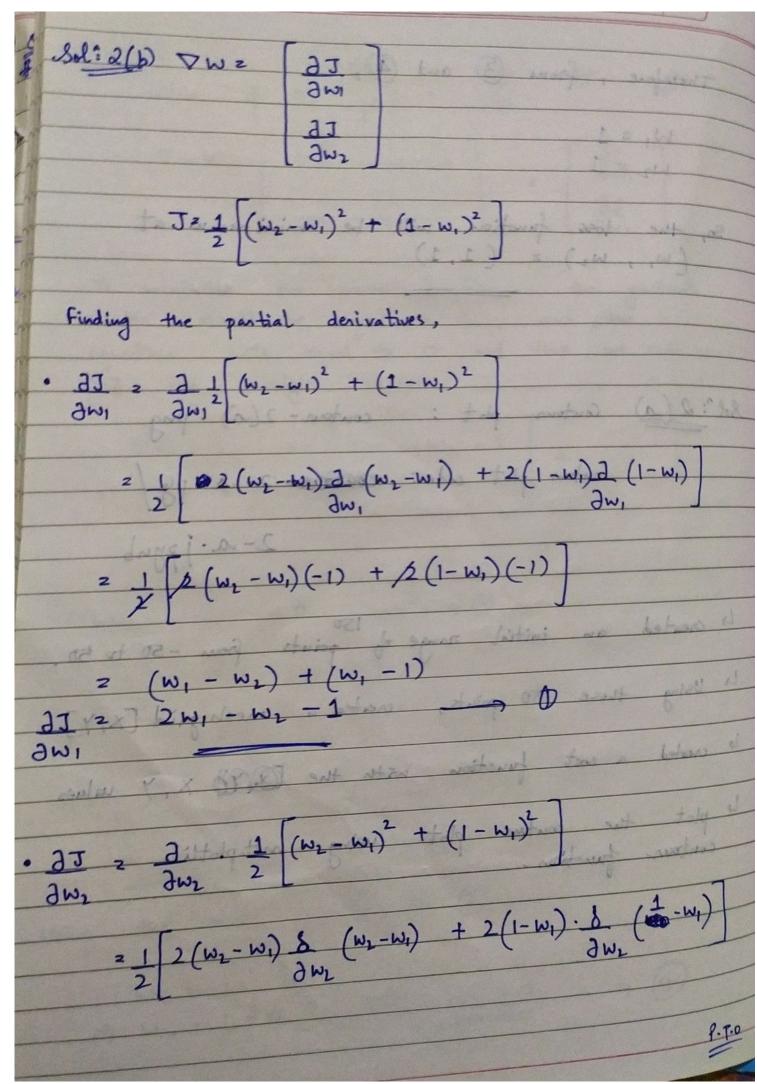
$$0 \Rightarrow \frac{1 \cdot \alpha x^{2}}{0!} + \frac{1 \cdot x}{1!} + \frac{1 \cdot x^{2}}{2!} + \dots + \frac{1 \cdot x^{n}}{n!}$$

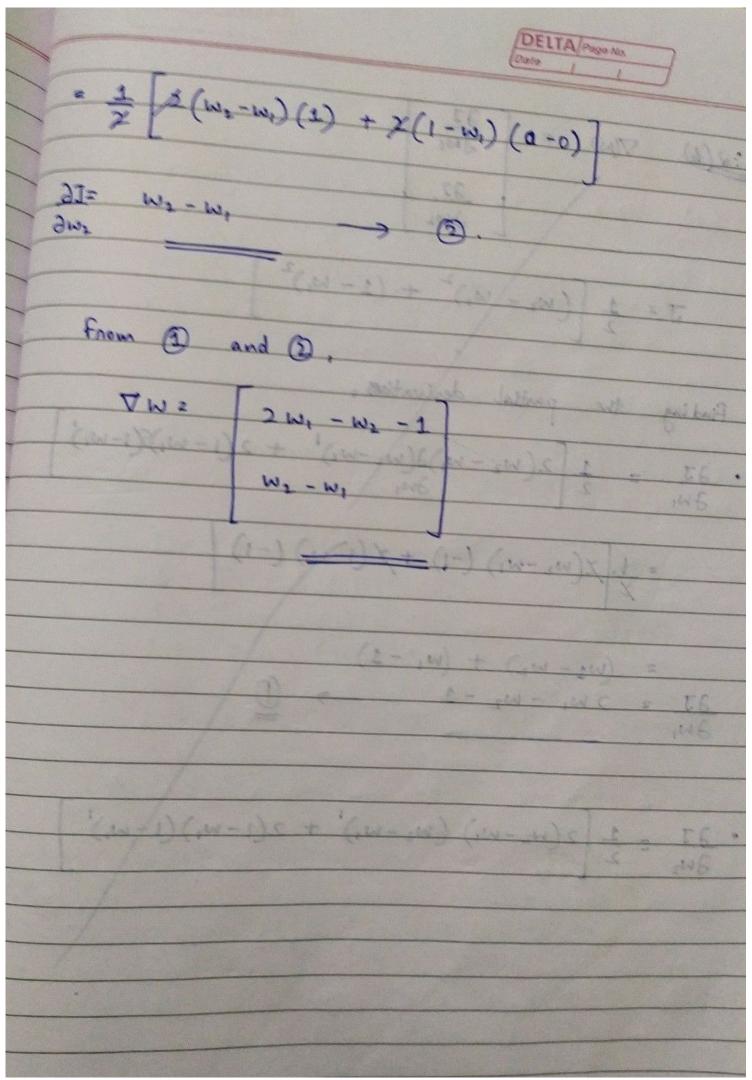
$$\frac{T_{n}(x)}{\sqrt{2!}} = \frac{1 + x + \frac{x^{2}}{2!} + \frac{x^{3}}{3!} + \dots + \frac{x^{n}}{n!}}{\sqrt{2!}}$$

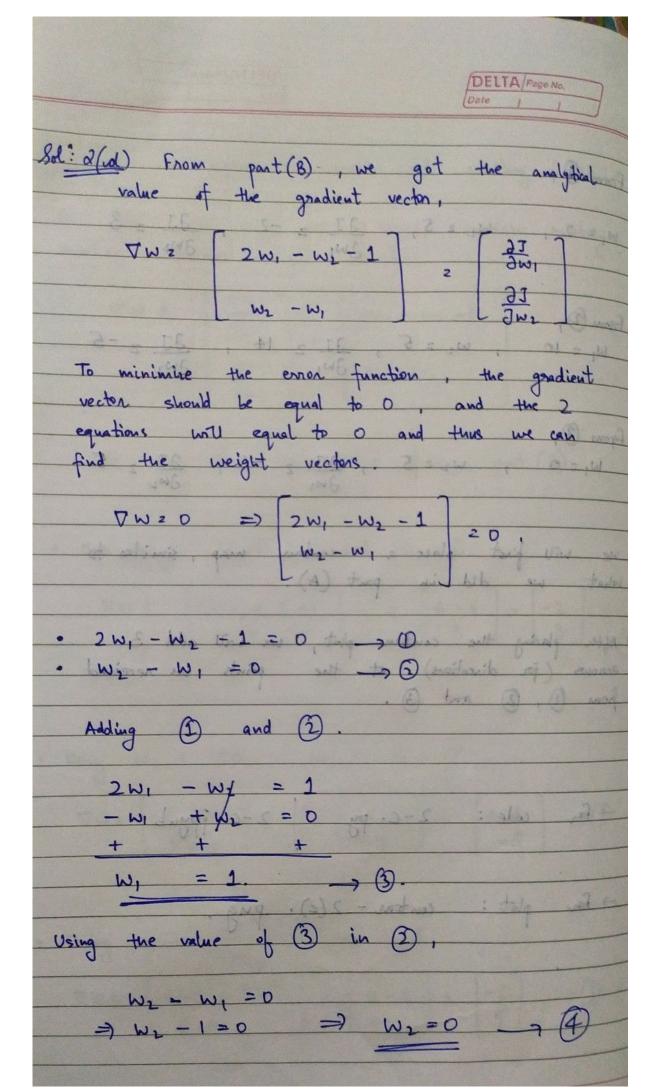
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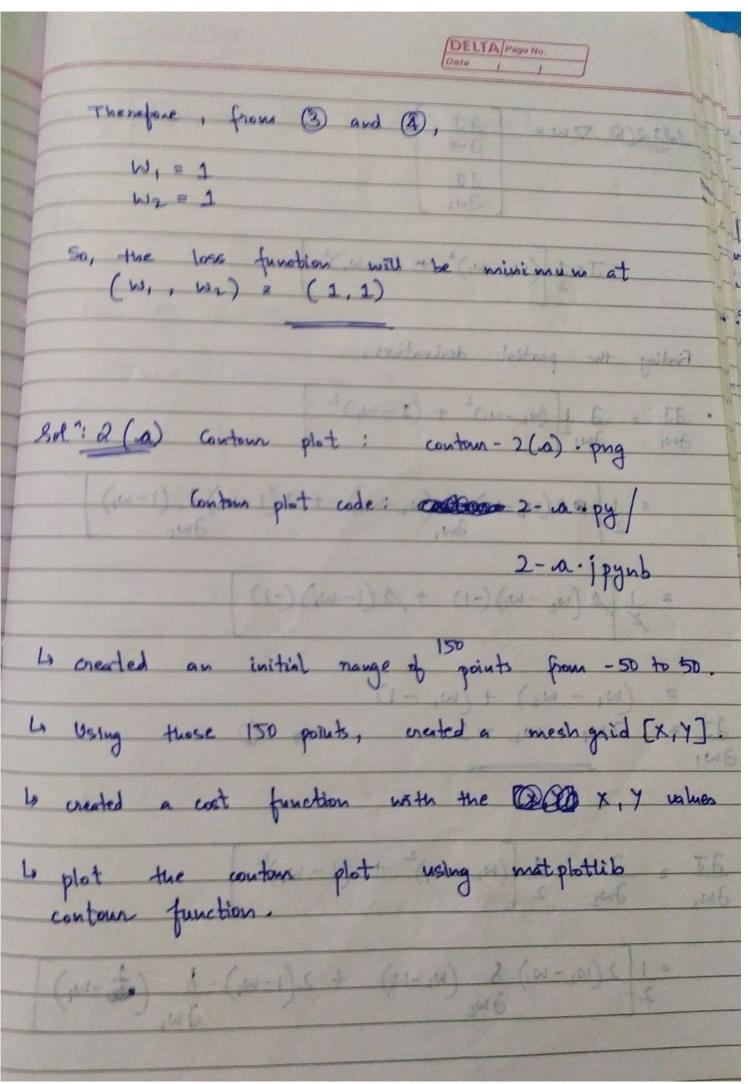
fol:1(6) As we know the toylor series expression: Thick $f(x) = e^{x}$ Thick $f(x) = e^{x}$ $f(x) = 1 + x + \frac{x^{2}}{2!} + \frac{x^{3}}{3!} + \cdots + \frac{x^{n}}{n!}$. To plot a graph to see what happens as we progressively take higher terms order terms: Lo create a sample space of 150 points from
-4 to 4. The various graphs will be plat
using these point. 4) Take an output dummy array with a length of 5 (max order term is 4), the graphs will be pot on the points added to this array. Is loop on a range of 0 >5, for index of o position value in taylor series is 1, for the sest, add the previous index value plus, (xi | i |). Stone all the values in the dummy output array. to use the dummy array to plat the graphs.

and I actual ex graph that we are bying model using the Taylor series 6 graph: ing-1(b). png Graph code: 1-b. py / 1-b. ipynb









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