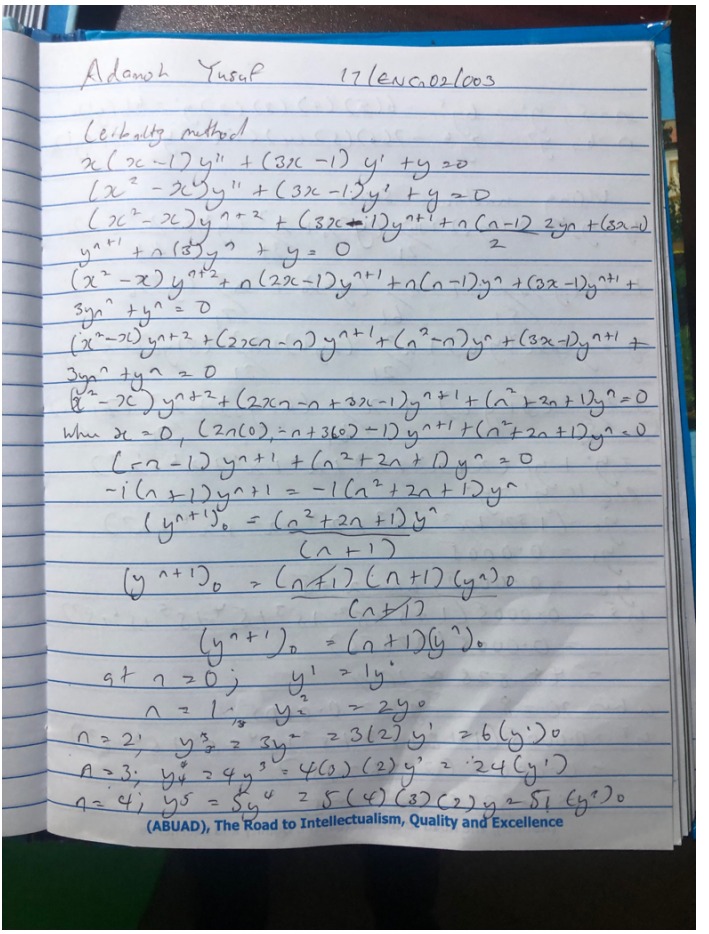
Saved Photos



$n=5,\ y^5 = 6y^5 = 6(5)(4)(3)(2)y^0 = 6!(y^1)_0$

$n=6,\ y^7 = 7y^6 = 7(6)(5)(4)(3)(2)y^1 = 7!(y^1)$

Using maclaurin series

$$y = y_0 + x(y_1) + \frac{x^2}{2!}(y^2)_0 + \frac{x^3}{3!}(y^3)_0 + \frac{x^4}{4!}(y^4)_0$$

$$+ \frac{x^5}{5!}(y^5)_0 + \frac{x^6}{6!}(y^6)_0 + \frac{x^7}{7!}(y^7)_0$$

$$y = y^0 + 0!(y'_0) + \frac{x^2}{2!}(2y'_0) + \frac{x^3}{3!}(3!y_0) + \frac{x^4(4!y_0)}{4!}$$

$$+ \frac{x^5}{5!}(5!y'_0) + \frac{x^6}{6!}(6!y_0) + \frac{x^7}{7!}(7!y'_0)$$

$$= y^0 + y_1(x + x^2 + x^3 + x^4 + x^5 + x^6 + x^7)$$

Recall $y^1 = y^0$

$y_0 = (1 + x + x^2 + x^3 + x^4 + x^5 + x^6 + x^7)$

$y_1 = 0.0005$

$y_0 = 0.0005$, when $x = 5$

$y^5 = 0.0005(1 + 5 + 5^2 + 5^3 + 5^4 + 5^5 + 5^6 + 5^7)$

$= 0.0005(97656)$

$= 48.828 \approx 49$

when $x = 8 \quad y_0 = 0.0005$

$y^8 = 0.0005(1 + 8 + 8^2 + 8^3 + 8^4 + 8^5 + 8^6 + 8^7)$

$= 0.0005(2396745)$

$= 1198.3725 \approx 1198$

When $x = 10$ $y_{10} = 0.0005(1 + 10 + 10^2 + 10^3 + 10^4 + 10^5 + 10^6 + 10^7)$

$= 0.0005(11111111)$

$= 5555.5555 \simeq 5556$

6) Command window

```
clc
clear all
close all
syms x
x = 0:0.1:10
y = (0.0005)*(1 + x + x^2 + x^3 + x^4 + x^5 + x^6 + x^7)
y^ = subs(y)
yn = double(yn)
Plot (x, yn)
xlabel ('x')
ylabel ('T')
grid on
grid minor
axis tight
```