NAME: Sulaiman Ahmad Eniola
MATRIC NO: 15/ENG07/042.
DEPT: Petroleum Engineering

ENG 381 Assignment

Question:

$y = e^{x^2+x}$, show that $y'' - y'(2x+1) + xy$ and prove that $y^{(n+2)} - (2x+1)y^{(n+1)} + 2(n+1)y^n$

Solution

$y = e^{x^2+x}$ ... ①

$y^n = C_1 e^{ax}$ $y_1 = (2x+1)e^{x^2+x}$ ... ②

where $\frac{u\,du}{dx} + v\frac{dv}{dx}$

$u = 2x+1$; $\frac{du}{dx} = 2$

$v = e^{x^2+x}$; $\frac{dv}{dx} = (2x+1)e^{x^2+x}$

$y'' = (2x+1)(2x+1)e^{x^2+x} + 2e^{x^2+x}$

from eqn ② and ③

$y'' - y'(2x+1)xy$

let $w_1 = y_2$ $w = y'(2x+1)$

$u = y^2$ $v = 1$

$u^2 = y(2+2)$

$u = y^{(1)}$ $v = 2x+1$

$u^2 = y^{(1+n)}$ $v' = 2$

$u^{n+1} = y^n$

$u_2 = 2y$

$u = y$ $v = 2$

$u^n = y^{(n)}$

$u^{(n)} = u_2^{(n)} + u_3^{(n)}$

$y^n = u^{(n)}v + nu^{(n-1)}v$

$y^{(n+n)} = y^{(1+n)} \cdot (2x+1) + n(y^{(n)}) \cdot 2 + (n)2$

$y^{(2n)} = (2x+1)y^{(1+n)} + 2(n+1)y^{(n)}$