

ASG - 6

1. Modified Bessel Equⁿ:

$$x^2 \frac{d^2}{dx^2} y(x) + x \frac{d}{dx} y(x) - x^2 y(x) = 0$$

Assume the solⁿ around infinity a.

$$y_0(x) \sim \frac{e^x}{\sqrt{2\pi x}} [1 + b_1 x^{-1} + b_2 x^{-2} + \dots]$$

Find b_1 & b_2 .

2. Solve Legendre Equⁿ.

$$(1-x^2)y'' - 2xy' + n(n+1)y = 0$$

a) Find both solutions and show that both series diverges for $x = \pm 1$, for generic n .

b) For what condition on n , ~~can~~ we can make a series convergent?

3) Laguerre's eqⁿ. $xy'' - (1-x)y' + ny = 0$

has one solⁿ $y_1(x) = 1$, for $n = 0$.

For this case, find the other independent solution.