

Summary

Following concepts are explained in this lecture.

The general form of linear homogeneous equations with constant co-efficients is $p_0 \frac{d^n y}{dx^n} + p_1 \frac{d^{n-1} y}{dx^{n-1}} + p_2 \frac{d^{n-2} y}{dx^{n-2}} + \dots p_{n-1} \frac{dy}{dx} + p_n y = 0$ in which $p_0 \neq 0, p_1, p_2, \dots, p_n$ are constants.

The characteristic equation of linear homogeneous differential equation is $F(D) = (D-m_1)(D-m_2)(D-m_3) \dots (D-m_{n-1})(D-m_n) = 0$.

In the above equation $m_1, m_2, m_3, \dots, m_n$ are called the characteristic roots.

Suppose $m_1 \neq m_2 \neq m_3 \neq m_4 \dots m_{n-1} \neq m_n$ in the homogeneous linear differential equations (HLDE). Then $y = c_1 e^{m_1 x} + c_2 e^{m_2 x} + c_3 e^{m_3 x} + \dots c_n e^{m_n x}$ involving n linearly independent solutions of (HLDE) with c arbitrary constants.