Cauchy-Euler equations

The method used to solve linear differential equations with constant coefficients studied in Module 12 *required* that the coefficients be constants. In this module, we develop a similar method for solving linear differential equations, but which only works for a certain, different, class of such equations, called *Cauchy-Euler equations*.

Definition

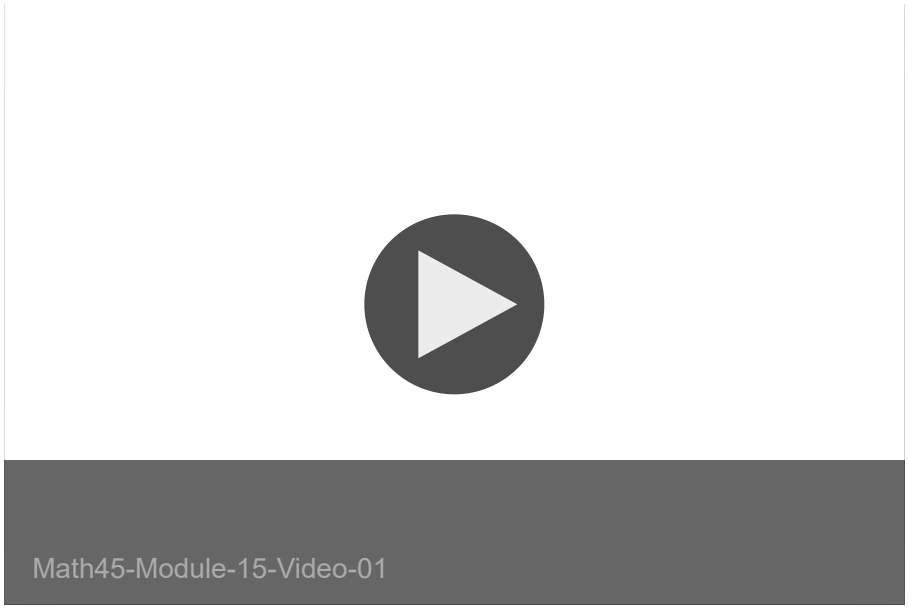
A differential equation of the form

$$a_n x^n y^{(n)} + a_{n-1} x^{n-1} y^{(n-1)} + \cdots + a_2 x^2 y'' + a_1 x y' + a_0 y = 0,$$

where $a_0, a_1, \ldots, a_n$ are constants, is called a **Cauchy-Euler equation**.

Thus, the defining charactersistic of Cauchy-Euler equations is the presence of the term x^k in the coefficient of the k-th derivative.

Discussion, comments, and examples:



WeBWorK module 15 exercises:

- Problems 1

Relevant Wikipedia articles:

- Cauchy-Euler equations (https://en.wikipedia.org/wiki/Cauchy%E2%80%93Euler_equation)