

## Problem 19

Let the linear differential operator  $L$  be defined by

$$L[y] = a_0y^{(n)} + a_1y^{(n-1)} + \cdots + a_ny,$$

where  $a_0, a_1, \dots, a_n$  are real constants.

- (a) Find  $L[t^n]$ .
- (b) Find  $L[e^{rt}]$ .
- (c) Determine four solutions of the equation  $y^{(4)} - 5y'' + 4y = 0$ . Do you think the four solutions form a fundamental set of solutions? Why?