

Name:

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Exercise 1

Consider the differential equation

$$(x - 1)y'' + 2y' = 0. \tag{1}$$

- (1) Find two linearly independent power series solutions around $x_0 = 0$ of (1).
- (2) Find the general solution of the DE (1).

Exercise 2

Consider the differential equation

$$xy'' + y' + xy = 0. \tag{2}$$

- (1) Show that $x_0 = 0$ is a regular singular point of the DE (2).
- (2) Find the Frobenius solution with the indicial root $r = 0$.