

**Problem 19**

- (a) By making the change of variable  $x - 1 = t$  and assuming that  $y$  has a Taylor series in powers of  $t$ , find two series solutions of

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

in powers of  $x - 1$ .

- (b) Show that you obtain the same result by assuming that  $y$  has a Taylor series in powers of  $x - 1$  and also expressing the coefficient  $x^2 - 1$  in powers of  $x - 1$ .