

MTHSC 208, HW 17

- (1) Section 4.5 #3, 16
- (2) Section 5.1 #27
- (3) Section 5.2 #3, 5
- (4) Section 5.3 #8, 9, 24
- (5) Section 5.4 #24
- (6) Section 5.5 #1, 2, 28, 29
- (7) Consider the differential equation $3xy'' + y' + y = 0$. Since $x_0 = 0$ is a regular singular point, there is a solution of the form

$$y(x) = \sum_{n=0}^{\infty} a_n x^{n+r}.$$

- (a) Determine the indicial equation (solve for r) and the recursion formula.
 - (b) Find two linearly independent generalized power series solutions.
 - (c) What is the radius of convergence of these solutions? (Hint: First compute the radius of convergence of $xP(x)$ and $x^2Q(x)$).
- (8) Consider the differential equation $2xy'' + y' + xy = 0$. Since $x_0 = 0$ is a regular singular point, there is a solution of the form

$$y(x) = \sum_{n=0}^{\infty} a_n x^{n+r}.$$

- (a) Determine the indicial equation (solve for r) and the recursion formula.
 - (b) Find two linearly independent generalized power series solutions.
 - (c) What is the radius of convergence of these solutions?