

PROBLEM SET 26: SERIES SOLUTIONS OF DIFFERENTIAL EQUATIONS

Note: Most of the problems were taken from the textbook [1].

Problem 1. Use power series to solve the differential equations.

a) $y' = x^2y$;

b) $y'' + xy' + y = 0$;

c) $(x - 1)y'' + y' = 0$;

d) $x'' = xy$;

e) $y'' = y$;

f) $(x - 3)y' + 2y = 0$.

Problem 2. Use power series to solve the initial-value problem.

a) $y'' - xy' - y = 0$, $y(0) = 1$, $y'(0) = 0$;

b) $y'' + x^2y = 0$, $y(0) = 1$, $y'(0) = 0$;

c) $y'' + x^2y' + xy = 0$, $y(0) = 0$, $y'(0) = 1$.

REFERENCES

- [1] J. Stewart: *Single Variable Calculus* 8th Edition, Cengage Learning, Boston 2015.