SARDAR VALLABHBHAI PATEL INSTITUTE OF TECHNOLOGY
VASAD
B. E. Third Semester (2017-18)
Subject: Advanced Engineering Mathematics (2130002)

Tutorial: 8

1 Classify the singularities for the differential equation

$y''+3x^2y'+2xy=0,\quad where\ \ y''=\frac{d^2y}{dx^2},\ \ y'=\frac{dy}{dx}$

2 Determine that $x=1$ is a regular singular point of $\left(1-x^2\right)y''-2xy'+n\left(n+1\right)y=0,$ n is a constant.

3 Classify the singularities for differential equation $\left(x^2+1\right)y''-xy'-y=0$

4 Determine the singular points of the differential equation $2x\left(x-2\right)^2y''+3xy'+\left(x-2\right)y=0$ and classify them as regular or irregular.

5 Determine the singular points of the differential equation $\left(x-3\right)y''-2x^2y'+7\left(x-1\right)y=0$ and classify them as regular or irregular.

6 Find Power series solution of $\frac{d^2y}{dx^2}+xy=0$

7 Solve the equation $\frac{d^2y}{dx^2}+y=0$ by the power series method.

8 Obtain the series solution of $\left(1-x^2\right)y''-2xy'+2y=0$

9 Find the power series solution in power of x of $y'+2xy=0$

10 Solve the Legendre's equation $\left(1-x^2\right)y''-2xy'+n\left(n+1\right)y=0,$ for $n=0$