Math 571
Homework 4

Write Matlab programs to numerically solve the following equations. Also use Maple to find exact solution to compute the error between exact and numerical solution.

Q1. \(y'' = -(m\pi)^2 \sin(m\pi x), \ y(-1) = y(1) = 0.\)

Q2. \(x^2y'' + 2xy' - 6y = |x|, \ y(-1) = y(1) = 1.\)

Q3. \(x^2y'' + xy' + (x^2 - v^2)y = \frac{x-v}{\pi} \sin(v\pi), \ y(0) = 0, \ y(2\pi) = 2 \text{ for } v = 1.\) Exact=4*besselj(1, x)*pi/(2*besselj(0, 2*pi)*pi-besselj(1, 2*pi));

Q4. \(y'' - 2xy' + \lambda y = 0, \ y(0) = 0, \ y(1) = 1 \text{ for } \lambda = 3\)