

Worksheet # 3

Date : 31/01/2024

MTH204: ODEs/PDEs

Semester: Winter 2024

Name: _____

Section: _____

Problem 1. If, in the motion of a small body on a straight line, the sum of velocity and acceleration equals a positive constant, how will the distance $y(t)$ depend on the initial velocity and position?

Problem 2. Verify that the functions $x^{3/2}$ and $x^{-1/2}$ are a basis of solutions of the ODE

$$4x^2y'' - 3y = 0$$

Find the particular solution satisfying $y(1) = -3$, $y'(1) = 0$.

Problem 3. Find an ODE whose basis of solutions are $e^{\sqrt{5}x}$ and $xe^{\sqrt{5}x}$.

Problem 4. How does the frequency of the harmonic oscillation (undamped) change if we

- (a) double the mass,
- (b) take a spring of twice the modulus?

Problem 5. Are the functions x^2 and $x^2 \ln x$ linearly independent on the interval $x > 1$?