

FINAL PRACTICE EXAM

Problem 1. Solve the initial value problem

$$y' = (1 - 2x)y^2, y(0) = -\frac{1}{6}.$$

Problem 2. Find the general solution to the ordinary differential equations

$$y'' - 4y' + 4y = e^{2t}.$$

Problem 3. Solve the ordinary differential equation

$$(2x + y + 1)dx + (3y^2 + x)dy = 0.$$

Problem 4. Find the general solution to the ordinary differential equation

$$\frac{d^4y}{dt^4} + 16y = e^t.$$

Problem 5. Find the general solution to the system of ordinary differential equations

$$\frac{dx}{dt} = \begin{pmatrix} 1 & 1 \\ 1 & 1 \end{pmatrix} x.$$

Problem 6. Solve the initial value problem

$$y'' + y' = \delta(t - 1), \quad y(0) = y'(0) = 0.$$

Problem 7. Solve the ordinary differential equation

$$\frac{dy}{dx} = \frac{x + y}{2x}.$$

Problem 8. A mass weighting $3lb$ stretches a spring $3in$. If mass is pushed upward, contracting the spring at distance of $12in$ and then set in motion with a downward velocity of $2ft/sec$ and if there is no air resistance, find the position $x(t)$ of the mass at any time t .

Typeset by $\mathcal{A}\mathcal{M}\mathcal{S}\text{-T}\mathcal{E}\mathcal{X}$