

## Part I Problems

In each of the following three problems find a particular solution to the differential equation. Use complex exponentials where possible.

**Problem 1:**  $y^{(3)} + y'' - y' + 2y = 2 \cos x$

**Problem 2:**  $y'' - 2y' + 4y = e^x \cos x$

**Problem 3:**  $y'' - 6y' + 9y = e^{3x}$

**Problem 4:** Find the real general solution to the DE

$$\frac{d^3x}{dt^3} - x = e^{2t}$$

**Problem 5:** Find a particular solution to the differential equation

$$y'' - 4y = \frac{1}{2} (e^{2x} + e^{-2x})$$

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