

# 10.47

## 1 10.47, §1 Asked

Solve:

$$y'' - 2y' + y = 3e^x$$

## 2 10.47, §2 Solution

$$y'' - 2y' + y = 3e^x$$

*Homogeneous equation:*

$$y_h = C_1e^x + C_2xe^x$$

*Particular solution:*

$$y_p'' - 2y_p' + y_p = 3e^x$$

Particular solutions  $y_p = e^x$  or  $y_p = xe^x$  don't work. Try

$$y_p = Ce^xx^2 \quad y_p' = Ce^x(x^2 + 2x) \quad y_p'' = Ce^x(x^2 + 4x + 2)$$

$$y_p'' - 2y_p' + y_p = Ce^x 2$$

so  $C = 1.5$ .

*Total solution:*

$$y = 1.5x^2e^x + C_1e^x + C_2xe^x$$

