

§2.4 Homework Solutions

#25. Suppose y_1 solves $y' + py = 0$, that is $y_1' + py_1 = 0$.
Suppose y_2 solves $y' + py = g$, that is $y_2' + py_2 = g$.

Let $y = y_1 + y_2$.

To see the DE satisfied by $y = y_1 + y_2$:

$$\begin{aligned}y' &= y_1' + y_2' \\ &= -py_1 + g - py_2 \\ &= -p(y_1 + y_2) + g \\ &= -py + g\end{aligned}$$

so, adding py to both sides of this eqn yields:

$$y' + py = g.$$

This is the DE satisfied by $y = y_1 + y_2$.