

Aufgabe 1: $y'' + y = 0$
 Lösung: $y_1(x) = \cos(x)$, $y_2(x) = \sin(x)$
 $y(x) = C_1 \cos(x) + C_2 \sin(x)$
 $y(0) = 1 \Rightarrow C_1 = 1$
 $y'(0) = 0 \Rightarrow -C_1 \sin(0) + C_2 \cos(0) = 0 \Rightarrow C_2 = 0$
 $y(x) = \cos(x)$

Aufgabe 2: $y'' + 4y = 0$
 Lösung: $y_1(x) = \cos(2x)$, $y_2(x) = \sin(2x)$
 $y(x) = C_1 \cos(2x) + C_2 \sin(2x)$
 $y(0) = 1 \Rightarrow C_1 = 1$
 $y'(0) = 0 \Rightarrow -2C_1 \sin(0) + 2C_2 \cos(0) = 0 \Rightarrow C_2 = 0$
 $y(x) = \cos(2x)$

Aufgabe 3: $y'' + y = 0$
 Lösung: $y_1(x) = \cos(x)$, $y_2(x) = \sin(x)$
 $y(x) = C_1 \cos(x) + C_2 \sin(x)$
 $y(0) = 1 \Rightarrow C_1 = 1$
 $y'(0) = 0 \Rightarrow -C_1 \sin(0) + C_2 \cos(0) = 0 \Rightarrow C_2 = 0$
 $y(x) = \cos(x)$

Aufgabe 4: $y'' + y = 0$
 Lösung: $y_1(x) = \cos(x)$, $y_2(x) = \sin(x)$
 $y(x) = C_1 \cos(x) + C_2 \sin(x)$
 $y(0) = 1 \Rightarrow C_1 = 1$
 $y'(0) = 0 \Rightarrow -C_1 \sin(0) + C_2 \cos(0) = 0 \Rightarrow C_2 = 0$
 $y(x) = \cos(x)$

Aufgabe 5: $y'' + y = 0$
 Lösung: $y_1(x) = \cos(x)$, $y_2(x) = \sin(x)$
 $y(x) = C_1 \cos(x) + C_2 \sin(x)$
 $y(0) = 1 \Rightarrow C_1 = 1$
 $y'(0) = 0 \Rightarrow -C_1 \sin(0) + C_2 \cos(0) = 0 \Rightarrow C_2 = 0$
 $y(x) = \cos(x)$