

Aufgabe 34

Bestimmen Sie alle Lösungen der Homogenen Linearen DG !

a) $y'' = -y' + 12y$ b) $y''' = 5y'' - 8y' + 4y$ c) $2y'' + 12y' + 18y = 0$

d) $y'' + 16y = 0$ e) $y'' = 2y' - 10y$ f) $y'' + 4y' + 8y = 0$

g) $y^{(4)} + \frac{9}{2}y^{(2)} + \frac{81}{16}y = 0$ h) $\ddot{x} + 2\mu\dot{x} + \omega_0^2x = 0, \mu > 0, \omega_0 > 0$

Aufgabe 35

Bestimmen Sie alle Lösungen der ILDG !

a) $y' + y = x + 1$ b) $y'' = 5y' - 6y + 6x^2 + 2x + 16$ c) $y'' + y = \sin(x)$

d) $y'' - 3y' + 2y = e^{17x}$ e) $y'' + 2y' = xe^x$ f) $y'' = 4y' - 4y + e^{2x}$

g) $y'' = 3y' - 2y + xe^x$ h) $y''' + y'' = 6x + e^{-x}$

i) $y'' + 3y' + 2y = \sin(2x) + 2 \cdot \cos(2x)$ j) $y'' + 4y' + 4y = \frac{e^{-2x}}{x^3}$

Aufgabe 36

Lösen Sie das AWP !

a) $y'' + y = 0 \wedge f(\frac{\pi}{4}) = 1 \wedge f'(\frac{\pi}{4}) = 0$ b) $3y'' = 6y' - y \wedge f'(0) = 2 \wedge f(0) = 2$

c) $y'' + 6y' + 10y = 0 \wedge f(0) = f'(0) = 1$ d) $y'' + 6y' = -9y \wedge f(0) = f'(0) = 1$

e) $y'' + 2y' + 2y = e^{-2x} \wedge f(0) = 0 \wedge f'(0) = 1$

f) $y'' = 5y' - 6y + e^{2x} \wedge f(0) = 2 \wedge f'(0) = 3$

g) $y'' = 3x^{\frac{3}{2}} \cdot e^x + 2y' - y \wedge f'(0) = 0 \wedge f(0) = 1$

h) $y''' = 18x - 9y' \wedge f(\pi) = \pi^2 \wedge f'(\pi) = 2\pi \wedge f''(\pi) = 20$

i) $y''' + 8y'' + 17y' + 10y = 34 \cdot \sin(x) + 12 \cdot \cos(x) \wedge f(0) = 1$
 $\wedge f'(0) = -3 \wedge f''(0) = 8$

Aufgabe 32

Wie lautet die allgemeine Lösung der gewöhnlichen Differentialgleichung?

a) $2x^2y' = y^2$ b) $y' = (y+2)^2$ c) $y' \cdot (1+x^3) = 3x^2y$ d) $y' = 3x - 2xy$