



4. Higher-Order Linear Ordinary Differential Equations

1. $y'''_{xxx} + \lambda y = 0.$
2. $y'''_{xxx} = ax^\beta y.$
3. $(x - a)^3(x - b)^3 y'''_{xxx} - cy = 0, \quad a \neq b.$
4. $(ax^2 + bx + c)^3 y'''_{xxx} = ky.$
5. $y''''_{xxxx} + ay = 0.$
6. $y''''_{xxxx} + ax^n y''_{xx} + b(ax^n - b)y = 0.$
7. $x^2 y''''_{xxxx} + 6x y'''_{xxx} + 6y''_{xx} - a^2 y = 0.$ *Equation of transverse vibrations of a pointed bar.*
8. $(ax^2 + bx + c)^4 y''''_{xxxx} = ky.$
9. $y^{(6)}_x + ay = 0.$
10. $y^{(2n)}_x = a^{2n} y.$
11. $y^{(n)}_x = axy + b, \quad a > 0.$
12. $y^{(n)}_x = ax^\beta y.$
13. $(ax + b)^n(cx + d)^n y^{(n)}_x = ky.$
14. $(ax^2 + bx + c)^n y^{(n)}_x = ky.$
15. $a_n y^{(n)}_x + a_{n-1} y^{(n-1)}_x + \dots + a_1 y'_x + a_0 y = 0.$ *Constant coefficient linear equation.*
16. $a_n x^n y^{(n)}_x + a_{n-1} x^{n-1} y^{(n-1)}_x + \dots + a_1 x y'_x + a_0 y = 0.$ *Euler equation.*

The EqWorld website presents extensive information on solutions to various classes of ordinary differential equations, partial differential equations, integral equations, functional equations, and other mathematical equations.