

Shepley L. Ross *Introduction to Ordinary Differential Equations*

Chapter 4. Explicit Methods of Solving Higher-Order Linear
Differential Equations

4.5. The Cauchy-Euler Equation

4.5.1. Find the general solution of $x^2y'' - 3xy' + 3y = 0$ where $x > 0$

4.5.5. Find the general solution of $x^2y'' + xy' + 4y = 0$ where $x > 0$.

4.5.9. Find the general solution of $9x^2y'' + 3xy' + y = 0$ where $x > 0$.

4.5.13. Find the general solution of $x^3y''' - x^2y'' - 6xy' + 18y = 0$ where $x > 0$. HINT: $m = -2$ is a zero of the auxiliary equation of the transformed DE.

4.5.15. Find the general solution of $x^2y'' - 4xy' + 6y = 4x - 6$ where $x > 0$.

4.5.23. Solve the IVP $x^2y'' - 2xy' - 10y = 0$, $y(1) = 5$, $y'(1) = 4$. Assume $x > 0$ (notice that the initial conditions are given for $x = 1 > 0$).

4.5.29. Solve the IVP $x^2y'' - 5xy' + 8y = 2x^3$, $y(2) = 0$, $y'(2) = -8$. Assume $x > 0$ (notice that the initial conditions are given for $x = 2 > 0$).