

$$y'(x) + p(x)y(x) = q(x)y^n(x)$$

$$\stackrel{\times y^{-n}(x)}{\implies} y^{-n}(x)y'(x) + p(x)y^{1-n}(x) = q(x)$$

$$y^{1-n}(x) \triangleq u(x)$$

$$\stackrel{\frac{d}{dx}}{\implies} (1-n)y^{-n}(x)y'(x) = u'(x) \implies y^{-n}(x)y'(x) = \frac{1}{1-n}u'(x)$$

$$\implies \frac{1}{1-n}u'(x) + p(x)u(x) = q(x) \implies u'(x) + (1-n)p(x)u(x) = (1-n)q(x)$$

$$\implies u(x) = \frac{1}{\mu(x)} \{ \mu(x)(1-n)q(x)dx + c \}, \quad \mu(x) = e^{\int (1-n)p(x)dx}$$

$$\implies y(x) = \left(\frac{1}{\mu(x)} \{ \mu(x)(1-n)q(x)dx + c \} \right)^{\frac{1}{1-n}}$$

Mehdi Rahmani-Andebili

Differential Equations

Practice Problems, Methods, and Solutions

Applied Differential Equations Second Edition

J. Tinsley Oden, Leszek Demkowicz



Applied Differential Equations Second Edition:

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