3   同次形 Homogenous equations

3.1   p.17

Consider the following differential equation,

$$xy\frac{dy}{dx} = x^2 + y^2. \tag{$*$}$$

(a) Find the general solution of $(*)$.

(b) Eliminate an arbitrary constant in the solution obtained in (a)n and verify whether $(*)$ can be derived.

(c) Verify whether the solution derived in (a) satisfys the equation $(*)$.

3.2   p.12, 14,17

Find the general solution for each of the following differential equations;

(1) $3xy^2y' = x^3 + y^3$

(2) $(x^2 + xy)y' = y^2$

3.3

Find the particular solution for the following differential equation

$xy' = y + x\cot(y/x)$

that satisfys the initial condition $y = 0$ at $x = \sqrt{2}$.