

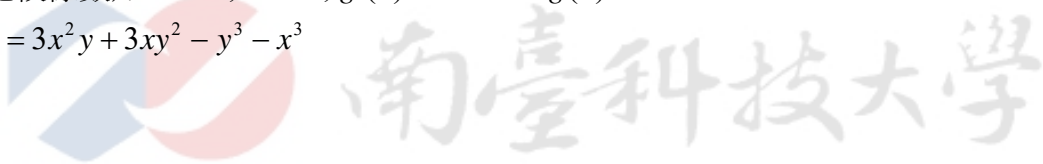
$f(z) = u(x, y) + iv(x, y)$  is an analytic complex function. It is known that  $u(x, y) = x^3 + 3x^2y + axy^2 + by^3$ . Please find  $v(x, y)$  and the values of  $a$  and  $b$ . [92 中正機械 6]

$$[\text{解}] v_y = u_x = 3x^2 + 6xy + ay^2 \Rightarrow v = 3x^2y + 3xy^2 + \frac{1}{3}ay^3 + g(x)$$

$$u_y = -v_x \Rightarrow 3x^2 + 2axy + 3by^2 = -[6xy + 3y^2 + g'(x)]$$

$$\text{比較係數知 } a = -3, b = -1, g'(x) = -3x^2 \Rightarrow g(x) = -x^3$$

$$v = 3x^2y + 3xy^2 - y^3 - x^3$$



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