

Find the analytic function  $f(z) = u(x, y) + iv(x, y)$ , where  $v(x, y) = e^{-3x}\sin 3y$ . [106 中山光電 10]

$$[\text{解}] u_x = v_y = 3e^{-3x} \cos 3y \Rightarrow u = \int_x 3e^{-3x} \cos 3y dx + g(y) = -e^{-3x} \cos 3y + g(y)$$

$$u_y = -v_x \Rightarrow 3e^{-3x} \sin 3y + g'(y) = 3e^{-3x} \sin 3y \Rightarrow g'(y) = 0 \Rightarrow \text{令 } g(y) = 0$$

$$\begin{aligned} f(z) &= -e^{-3x} \cos 3y + ie^{-3x} \sin 3y = -e^{-3x} (\cos 3y + i \sin 3y) \\ &= -e^{-3x} \cdot e^{i3y} = -e^{-3(x-iy)} = -e^{-3\bar{z}} \end{aligned}$$



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