Hanan Madan
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Ques 1 Determine the analytic func^n whose real part is $e^x(x\cos 2y - y\sin 2y)$

Soln) $e^{2x}(x\cos 2y - y\sin 2y)$

$$\frac{\partial u}{\partial x} = e^x((\cos 2y - 0) + 2e^{2x}(x\cos 2y - y\sin 2y)$$
$$= e^x \cos 2y$$

$$= e^{2x}(\cos 2y + 2x(\cos 2y - 2y\sin 2y) = \phi_1(x,y)$$
$$\phi_1(z,0) = e^{-2z}(0) = 0$$

By milne thomson method.

$$F(z) = \int \phi_1(z,0)dz, \int \phi_2(z,0)dz + c$$

$$= \int e^{2z}(1+2z)dz - 0 + c$$

$$= (1+2z)\left(\frac{e^{2z}}{2}\right) - 2\left(\frac{e^{2z}}{4}\right) + c.$$

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Vs is given as x/x^2+y^2

$$\frac{dV}{dx} = \frac{(1.\varepsilon x^2 + y^2) - x(2y)}{(x^2+y^2)^2}$$

$$\left.\begin{matrix} x \to 2 \\ y \to 0 \end{matrix}\right\} \frac{\delta V}{\partial x} = \frac{z^2 - 2z^2}{z^4} = \frac{-1}{z^2}$$

$$\frac{\delta V}{\epsilon Y} = -2yx/x^2+y^2 = 0$$

$$\frac{dw}{dz} = 0 + (-1/z^2)$$

$$\int \delta w = -i \int \frac{1}{z^2} dz$$

$$w = \oplus i/z$$

$$f(z) = \frac{1}{z} \quad \& \quad (1+1) f(z) = f(z)$$

$$\boxed{f(z) = \left(\left(\frac{i}{i+1}\right)\frac{1}{z}\right)}$$