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Construction of Analytic function:

Milne-Thomson method:

Let 
$$f(z) = u + iv$$
 is to be constructed:

(i) Suppose the real past  $u$  is given, then

$$f(z) = \int \left[ \varphi_{i}(z,0) - i\varphi_{i}(z,0) \right] dz$$
where  $\varphi_{i}(z,0) = \frac{\partial u}{\partial x}(z,0)$ ,  $\varphi_{i}(z,0) = \frac{\partial u}{\partial y}(z,0)$ .

(ii) Suppose imaginary part  $v$  is given, then

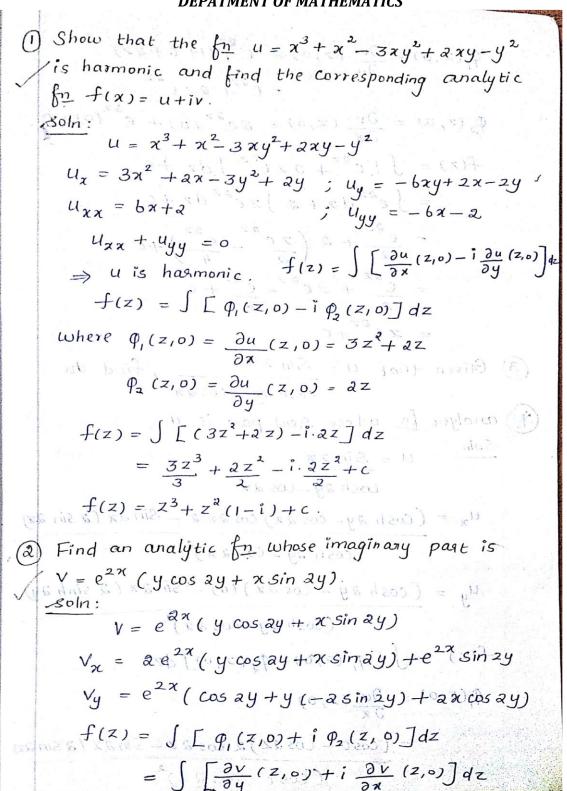
$$f(z) = \int \left[ \varphi_{i}(z,0) + i\varphi_{i}(z,0) \right] dz$$
where  $\varphi_{i}(z,0) = \frac{\partial v}{\partial y}(z,0)$ ,  $\varphi_{i}(z,0) = \frac{\partial v}{\partial x}(z,0)$ 





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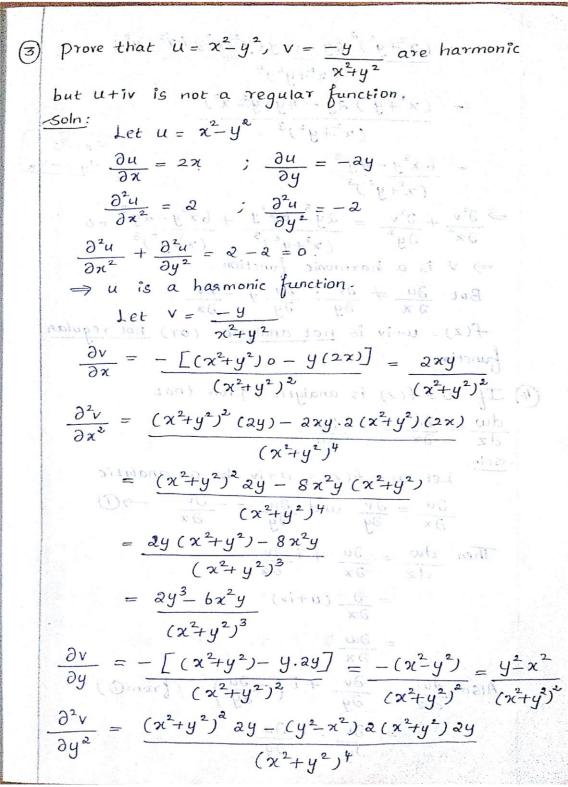






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$$\varphi_{1}(z,0) = \frac{\partial v}{\partial y}(z,0) = e^{2z}(1+0+az)$$

$$= e^{2z} + aze^{2z}$$

$$\varphi_{2}(z,0) = \frac{\partial v}{\partial x}(z,0) = ae^{2z}(0) + e^{2z}(0) = 0$$

$$f(z) = \int \int e^{2z} + aze^{2z} \int dz + c$$

$$= \int e^{2z} dz + a \int ze^{2z} dz + c$$

$$= \frac{e^{2z}}{a} + a \left(\frac{ze^{2z}}{a} - \frac{e^{2z}}{a}\right) + c$$

$$= \frac{e^{2z}}{a} + a \left(\frac{ze^{2z}}{a} - \frac{e^{2z}}{a}\right) + c$$

$$= \frac{e^{2z}}{a} + c$$

$$=$$





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$$= 2 \cos 2z - (2 \cos^{2} 2z - 2 \sin^{2} 2z)$$

$$= 2 \cos 2z - 2$$

$$(1 - \cos 2z)^{2}$$

$$= -2 (1 - \cos 2z)$$

$$= -2 (1 - \cos 2z)^{2}$$

$$= -2 (1 - \cos 2z)^{2}$$

$$= \frac{2}{1 - \cos 2z} = -2 (\cos 2z)$$

$$= -\cos 2z = -\cos 2z$$

$$(\cos 2z)^{2} = -\cos 2z$$

$$(\cos 2z)^{2} = -\cos 2z$$

$$(\cos 2z)^{2} = -\cos 2z$$

$$= 0.$$

$$f(z) = \int -\csc^{2} z \, dz = \cot z + c$$

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