

TUTORIAL: 04 LAPLACE'S & POISSON'S EQUATION.

1. If a potential $V = x^2 y z^2 + A y^3 z$ (i) find A so that Laplace's equation is satisfied
(ii) with the value of A, determine electric field (2, 1, -1).
2. Write Laplace's equation in three coordinate system, and application of it.
3. Describe general procedure of solving Laplace's and Poisson's equation.
4. Find the potential and the volume charge density at P (0.5, 1.5, 1) in free space given the potential field
(i) $V = 2x^2 - y^2 - z^2$ (ii) $V = 6e^x z$
5. Two parallel conducting disks are separated by a distance 7 mm at $z=0$ and $z=7$ mm. If $V=0$ at $z=0$, and $V=100$ at $z=7$ mm. Find charge density of disks.
6. State and prove uniqueness theorem.
7. Two conducting cone ($\theta = \pi/10$ and $\theta = \pi/6$) of infinite extent are separated by an infinitesimal gap at $r=0$. If $V(\theta = \pi/10) = 0$ and $V(\theta = \pi/6) = 50$ V. Find the V and E between the plates.