

SNS COLLEGE OF TECHNOLOGY



(An Autonomous Institution) Coimbatore – 35

DEPARTMENT OF MATHEMATICS UNIT - III COMPLEX VARIABLES

HARMONIC JUNCTIONS:

petn: An expression of the form $\frac{\partial^2 \phi}{\partial x^2} + \frac{\partial^2 \phi}{\partial y^2} = 0$ is called the Laplace equation in two dimension.

pefn: Any Junction having continuous second order partial desiratives which satisfies the Laplace oquation is called harmonie function.

Defn: dry two harmonic functions u and v such that J(z)= u+ix is analytic one called conjugate haemonie functions.

P.7. the function u= x3-32y2+322-3y2+1 is harmonic

Boln: Let u= 203_ 3214 322 392+ 1 Un = 3x2-3y2+6n; Uy=-6ny-6y Unn=6n+6; clyy=-6n-6=-(6n+6)

Unout Clyy =0 : u satisfies Laplace Egn.



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Solni u= y+ en cosy is talmonic Un = encosy; uy = 1-ensiny

Unn = encosy; uyy = -encosy

· unn + uyy = 0

· u satisfies Laplace egn => u is haemonie