

### SNS COLLEGE OF TECHNOLOGY



(An Autonomous Institution)
Coimbatore – 35

## DEPARTMENT OF MATHEMATICS UNIT-IV APPLICATION OF PARTIAL DIFFERENTIAL EQUATION

Type-II [Heat flows in y direction, air 0 < y < l.]

The boundary condition are:

(i) U(x,0) = 0(ii) U(y,l) = 0(iii) u(0,y) = 0(iv) u(0,y) = f(x), 0 < y < l.

The suitable soln is u(x,y) = (APX + Be PX) (c cospy+Dsinpy)

A square plate beld by the lines x=0, y=0, x=b & y=b its faces one insulated . The temp along the lower vertical edges is gn by u(b,y)=y(b-y), o < y < b, while the other three edges leept at  $o^{\circ}$ . Find the steady state temp in the plate doln! The boundary edters are

(i) u(x,0) = 0

· (ii) u (nib) = 0

(iii) u (0,4)=0

(iv) u (b,y)= y(b-y)

The suitable soln. is

U(x,y) = (Aepx + Bepx) (cospy+Dsinpy)

Apply (1) u(11,0) = (Aem+Be-Pn)c



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$$Apply (ii), u(x,b) = (Ae^{px} + Be^{-px}) D sin py ... (Apply (iii), u(x,b) = (Ae^{px} + Be^{-px}) D sin pb ... 0 = sin pb D (Ae^{px} + Be^{-px}) D sin pb ... 0 = sin pb D (Ae^{px} + Be^{-px}) D sin pb ... 0 = nii b ... D sin nii y ... Apply (iii), u(0,y) = (A+B) D sin nii y ... 0 = AB (e^{nii} x - e^{-nii} x) sin nii y ... 0 = AB (e^{nii} x - e^{-nii} x) sin nii y ... 0 = AB sin hnii sin nii y ... u(x,y) = Sin sin hnii sin nii y ... u(x,y) = Sin sin hnii sin nii y ... u(x,y) = Sin sin hnii sin nii y ... u(x,y) = Sin sin hnii sin nii y ... u(x,y) = Sin sin hnii sin nii y ... u(x,y) = Sin sin hnii sin nii y ... u(x,y) = Sin Sin ni$$



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$$An = \frac{4l^{2}}{n^{2}\pi^{2}} \frac{[1-(-1)^{n}]}{s^{2}n^{2}} \frac{1}{s^{2}n^{2}} \frac{[1-(-1)^{n}]}{s^{2}n^{2}} \frac{1}{s^{2}n^{2}} \frac{1}{s$$