Title
"Heat Transfer for a Cooling Fin"

Select
errlim= 1e-8
contours= 10          surfacegrid= 30

Variables
temp { degree (C) }

Definitions
{Basic SI units}
cm= 1e-2
    c= 4*cm
    d= .1 * cm

/* properties from text  page 7-7 */
/* aluminum J/(m - s - degC) */
k= 247
/* forced convection */
h= 250
ambientTemp = 30
xFlux = -k*dx(temp)  
yFlux= -k*dy(temp)
flux = -k*grad(temp)
convection = h *(temp - ambientTemp)

Initial Values

Equations

dx( xFlux )+ dy( yFlux)= 0

Constraints

Boundaries
region 1
start (0,-d)
natural(temp)= convection line to (c,-d)
natural(temp)= convection line to (c,d)
natural(temp)= convection line to (0,d)
value(temp)= 65 line to finish

Monitors

Plots
contour(temp)
vector(xFlux,yFlux) as "Direction of heat flow"
elevation( temp ) as "Temperature Distribution Along Center" from (0,0) to (c,0)
elevation( temp ) as "Temperature Distribution Along Top" from (0,d) to (c,d)
elevation( yFlux ) as "y_Flux Distribution Along Top" from (0,d) to (c,d)
elevation( xFlux ) as "x_Flux Distribution Along Center" from (0,0) to (c,0)

**End**

***Notifications***
Info: Loading PDEase2D Student v3.0.1 Small Node Limit Engine (2 Equation)
Info: Starting run...
Info: Last Status: Grid#7 | Nodes=985 | Cells=454 | PDE Err=1.629E-6
Info: Run completed.
Normal Exit: PDEase server being shutdown.

Heat Transfer for a Cooling Fin
Heat Transfer for a Cooling Fin

Contours:

- min: 47.7
- a: 48
- b: 49
- c: 50
- d: 52
- e: 53
- f: 55
- g: 56
- h: 57
- i: 59
- j: 60
- k: 62
- l: 63
- m: 64
- max: 65

Heat Transfer for a Cooling Fin
Direction of heat flow

PdzPit01Cont: Gr=7  err=1.629E-6
Vol=0.004263
10/12/99 - 19:54:03

PdzPit02Vect: Gr=7  err=1.629E-6
 0<=X<=0.04
-0.001<=Y<=0.001
47.7<=c(X,Y)<=65
Vol=0.366E5  min=5866
max=2.366E5
10/12/99 - 19:54:04
Heat Transfer for a Cooling Fin

Temperature Distribution Along Center

0 <= X <= 0.04
47.71 <= f(X) <= 65
From (0,0) to (0.04,0)

PdzPlt03Elev: Gr=7  err=1.629E-6

Curves:
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a: temp
Area: 2.132

Temperature Distribution Along Top

0 <= X <= 0.04
47.7 <= f(X) <= 65
From (0,0.001) to (0.04,0.001)

PdzPlt04Elev: Gr=7  err=1.629E-6

Curves:
-----------
a: temp
Area: 2.131
Heat Transfer for a Cooling Fin

**y_Flux Distribution Along Top**

0\leq X\leq 0.04

4424\leq f(X)\leq 8823

From (0,0.001) to (0.04,0.001)

PdzPlt05Elev: Gr=7  err=1.629E-6

Curves:
- a: yFlux
  - Area: 232.5

Heat Transfer for a Cooling Fin

**x_Flux Distribution Along Center**

0\leq X\leq 0.04

4426\leq f(X)\leq 2.338E5

From (0,0) to (0.04,0)

PdzPlt06Elev: Gr=7  err=1.629E-6

Curves:
- a: xFlux
  - Area: 4272