## HEAT TRANSFER ANALYSIS OF RECTANGULAR PLATE WITH SPECIFIED TEMPERATURE



All dimensions are in m



Objective: Find the temperature distribution on a rectangular plate

## **Material property**

Thermal conductivity, k = 17.4 W/mK

## PROCEDURE

## **STEP**

1	Create 2 points at (0/0/0) (1/1/0)			
	Menu	:	Geometry $\rightarrow$ Key point $\rightarrow$ Create $\rightarrow$ Add	
Commands : P Parameters : (		:	POINT, ADD	
		:	(To be filled by the user)	
	Point Dat	a	0/0/0	

After filling the parameters click *ok* button. If apply button is not active then you press *ctrl+enter* key.

## 2 Create rectangular surface on two points

Menu : Geometry  $\rightarrow$  Surface  $\rightarrow$  Create  $\rightarrow$  Rect2P

Command : SURFACE, RECT2P

Parameters

•	Corners	Use mouse to pick the two
		points

At the end of the above operations, your screen should look like this.



#### 3 Meshing using quadrilateral elements

Menu : Mesh  $\rightarrow$  MeshGen  $\rightarrow$  QUAD

Command : MESH,QUAD



#### Parameters

:

Surface	Use mouse to select the surface. Here the surface id is 1
Element size	0.1
Method	Mapped
Туре	4-Node
Divisions	S1(D1):10/S1(D2):10/S1(D3):10/S1(D4):10
<b>Bias Factors</b>	

At the end of the above operations, your screen should look like this.



## 4 Set the analysis type

Menu	:	Analysis 🔿	• Analysis	Туре
------	---	------------	------------	------

Command : ANTYPE, ADD

Analysis	HT-Steady State
Types	

# F

## 5 Specify heat transfer boundary conditions

Menu :	Load/BC $\rightarrow$ Thermal $\rightarrow$	Temperature
--------	---	-------------

Command : HTTEMP, ADD

Parameters :

#### (i) $0^{0}$ C at right side boundary nodes

Nodes	Select right side nodes.
Temperature	0

#### (ii) 100°C at left side boundary nodes

Nodes	Select left side nodes.
Temperature	100
Set ID	2

At the end of the above operations, your screen should look like this.



## 6 Specify material properties

Menu : Property  $\rightarrow$  Material  $\rightarrow$  Thermal  $\rightarrow$  Isotropic

Command : MATERIAL, HTISOTROPIC

Parameters :

Elements	All
Thermal Conductivity	17.4
Density	0
Specific Heat	0

## 7 Specify Thickness Properties

Menu	:	Property $\rightarrow$ Physical $\rightarrow$ Thicknes
------	---	--

Command : THICKNESS, ADD

Parameters

:	Elements	All
	Thickness	0.001

## 8 Save the project

Menu : File  $\rightarrow$  Save

#### 9 Submit the job into FEAST

Click Run Solver button

At the end of the above operations, your screen should look like this.





After the solution is completed the message "Finished successfully" appears in the message box.

#### 10 Perform post processing

#### a) Contour

Menu	:	Post $\rightarrow$ Contour
Command	:	POST, CONTOUR

Parameters :

Item	Temperature
<b>Restrict</b> To	
Contour Type	Band
No. of contours	9
Decimal Places	2



At the end of the above operations, your screen should look like this.

#### b) Path Plot

Menu :	Post $\rightarrow$ PathPlot
--------	-----------------------------

:

Command : POST, PATHPLOT

Parameters

Item	Temperature
Path-Ends	1T11

At the end of the above operations a graph as shown appears in the viewport





c) Output file can be seen in \*.OUT