INVERSE HEAT CONDUCTION Ill-posed Problems

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Heat conduction Matlab function for the X22By1pt10Y22B00T0 case: **fdX22By1pt10Y22B00T0.m**

Syntax

```
fdX22By1pt10Y22B00T0(xd,yd,Wd,td,W0d,A)
```

Description

fdX22By1pt10Y22B00T0 (*xd*, *yd*, *Wd*, *td*, *W0d*, *A*) returns the dimensionless temperature *Td* at a given dimensionless location (*xd*, *yd*) with *xd* between 0 and 1, and *yd* between 0 and *Wd*, and at a given dimensionless time *td*, with an accuracy of 10^{-A} (*A* = 2, 3, …, 15) with respect to the maximum temperature rise that occurs at (*xd*, *yd*) = (0,0) and time *td*, for the X22By1pt10Y22B00T0 problem. Also, *W0d* indicates the dimensionless active region of the *xd* = 0 boundary (*W0d* <=*Wd*) of the 2D rectangular body.

If *xd*, *yd* and *td* are not single values but arrays (length(*xd*) = *m*, length(*yd*) = *n* and length(*td*) = *p*) defining the dimensionless coordinates and times of interest, the above function returns the dimensionless temperature *Td* as a 3D subscripted array, where size(*Td*) = [*m*, *n*, *p*].

Examples

Example 1

```
>> Td=fdX22By1pt10Y22B00T0(0,.5,2,1,1,3)

Td =

   0.997675612638785
```

Example 2

```
>> fdX22By1pt10Y22B00T0(0,.5,2,.1,1,3)
```

```
ans =

   0.344191629543494
```

Example 3

```
>> xd=[0 1]'

xd =

     0
     1

>> yd=[0 .5 1.5]'

yd =

                   0
   0.500000000000000
   1.500000000000000

>> td=[0.01 .1  1]'

td =

   0.010000000000000
   0.100000000000000
   1.000000000000000

>> Td=fdX22By1pt10Y22B00T0(xd,yd,2,td,1,15)

Td(:,:,1) =

   0.112837916709548   0.112836480687849   0.000001436021702
   0.000000000000059   0.000000000000059  -0.000000000000000


Td(:,:,2) =

   0.355712329409234   0.344192878294636   0.012633367714018
   0.007773962977228   0.007050462347188   0.000834830548103


Td(:,:,3) =

   1.052609800162855   0.982212447960683   0.351110404063755
   0.570106119415084   0.526292761741158   0.307051052901072
```