INVERSE HEAT CONDUCTION Ill-posed Problems

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Heat conduction Matlab function for the X22B20T0 case: **fdX22B20T0.m**

Syntax

```
fdX22B20T0(xd,td,trefd,A)
```

Description

fdX22B20T0 (*xd*, *td*, *trefd*, *A*) returns the dimensionless temperature *Td* at a given dimensionless location *xd* from the heated surface, between 0 and 1, and at a given dimensionless time *td*, for a dimensionless reference time of *trefd*, with an accuracy of 10^{-A} (*A* = 2, 3, …, 15) with respect to the maximum temperature rise that occurs at *xd* = 0 and time *td*, for the X22B20T0 problem.

If *xd* and *td* are not single values but arrays (length(*xd*) = *n* and length(*td*) = *m*) defining the dimensionless locations and times of interest, respectively, the above function returns the dimensionless temperature *Td* as double subscripted arrays, where size(*Td*) = [*m*, *n*].

Examples

Example 1

```
>> Td=fdX22B20T0(.25,.1,1,10)

Td =

   0.007622427630123
```

Example 2

```
>> fdX22B20T0(.25,.1,1,10)

ans =
```

```
   0.007622427630123
```

Example 3

```
>> A=15

A =

    15

>> trefd=0.5

trefd =

   0.500000000000000

>> xd=[0 0.5 0.75]'

xd =

                   0
   0.500000000000000
   0.750000000000000

>> td=[0.01 0.2]'

td =

   0.010000000000000
   0.200000000000000

>> Td=fdX22B20T0(xd,td,trefd,A)

Td =

   0.001504505556127   0.000000030893325   0.000000000003292
   0.134594081437650   0.025762933261180   0.010597571794326
```