

INVERSE HEAT CONDUCTION Ill-posed Problems

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Heat conduction Matlab function for the X12B20T0 case:
fdX12B20T0.m

Syntax

```
fdX12B20T0(xd,td,trefd,A)
```

Description

fdX12B20T0 (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} ($A = 2, 3, \dots, 15$) with respect to the maximum temperature rise that occurs at $xd = 0$ and time td , for the X12B20T0 problem.

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

Examples

Example 1

```
>> Td=fdX12B20T0(.25,.1,1,10)
```

```
Td =
```

```
0.037469565172924
```

Example 2

```
>> fdX12B20T0(.25,.1,1,10)
```

```
ans =
```

0.037469565172924

Example 3

```
>> A=15
```

```
A =
```

```
15
```

```
>> trefd=0.5
```

```
trefd =
```

```
0.5000000000000000
```

```
>> xd=[0 0.5 0.75]'
```

```
xd =
```

```
0  
0.5000000000000000  
0.7500000000000000
```

```
>> td=[0.01 0.2]'
```

```
td =
```

```
0.0100000000000000  
0.2000000000000000
```

```
>> Td=fdX12B20T0(xd,td,trefd,A)
```

```
Td =
```

```
0.0200000000000000 0.000000962833193 0.000000000138713  
0.4000000000000000 0.095840863068783 0.044430843666059
```