

Calculation with L^AT_EX by means of CalcT_EX

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August 11, 2009

Contents

1	Calculation with L^AT_EX	1
1.1	PROBLEM 1. q1	1
1.1.1	Calculation	2
1.1.2	Source – 3rd-eng-calc.tex	2

1 Calculation with L^AT_EX

This folder consider couples of examples – all files `*-calc.tex` in L^AT_EX input format with defined operations that are included in a single pdf document with calculated operations by means of CalcT_EX package.

For received a final calculation of all `*-calc.tex` files please use a LINUX prompt command: `sh go`.

For more info please visit a web page on: <http://sg.bzip.pl/CalcTeX> or contact me by e-mail: CalcTeX (at) onet (dot) eu

I am open for any kind of questions or commands.

The file `"1st-example-ke-eng-calc.tex"` is the simplest and I recommend this file for study of CalcT_EX used at first.

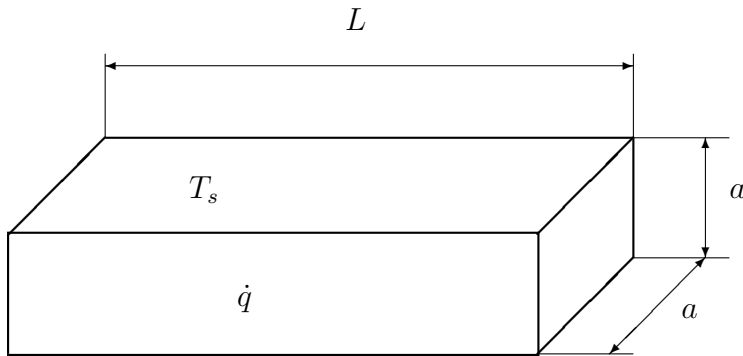
The file `"http://sg.bzip.pl/CalcTeX/example/all-in-one.tgz"` consider all necessary files for calculation of this example if you have installed a L^AT_EX compiler and python language as well it's checked for LINUX system.

All files which suits to mask `*-iso-calc.tex` are autamaticlly calculated and included into single pdf format document in order to `ls *-calc.tex` comment and for calulation are included all `python` files available on `bin/py` folder. This following example based on Richard J. Pryputniewicz calculation available on <http://users.wpi.edu/~chslt/courses/es3003/index.html>

1.1 PROBLEM 1. q1

Heat is generated in $a := 2.5 \cdot \text{cm}$ square copper rod at the rate of $\dot{q} := 35.3 \cdot \text{MW}/\text{m}^3$. The rod is exposed to a convection environment at $t_e := 20 \cdot ^\circ\text{C}$ where the convection heat transfer coefficient is $h := 4 \cdot \text{kW}/(\text{m}^2 \cdot ^\circ\text{C})$. Determine the surface temperature of the rod.

1.1.1 Calculation



$$\dot{q} \cdot V = h \cdot A_c \cdot (t_s - t_e) \quad (1)$$

$$\dot{q} \cdot a^2 \cdot L = h \cdot 4 \cdot a \cdot L \cdot (t_s - t_e) \quad (2)$$

$$t_s := \frac{\dot{q} \cdot a}{4 \cdot h} + t_e; \quad t_s \cdot ^\circ\text{C}^{-1} = 75.15625 \quad (3)$$

1.1.2 Source – 3rd-eng-calc.tex

This following example based on
[Richard J. Pryputniewicz](mailto:rjp@wpi.edu)
<http://users.wpi.edu/~chs/lt/rjp.html>
 calculation available on
<http://users.wpi.edu/~chs/lt/courses/es3003/index.html>

`\Task{PROBLEM 1. q1}`

Heat is generated in $a = 2.5 \text{ cm}$ square copper rod
 at the rate of $\dot{q} = 35.3 \text{ MW/m}^3$.
 The rod is exposed to a convection environment
 at $t_e = 20 \text{ }^\circ\text{C}$ where the convection
 heat transfer coefficient is $h = 4 \text{ kW/(m}^2 \cdot \text{ }^\circ\text{C)}$.
 Determine the surface temperature of the rod.

`\Calculation{}`

```
\input{figs/p1q1.latex}
\begin{equation}
\dot{q} \cdot V = h \cdot A_c \cdot \left( t_s - t_e \right)
\label{p1q1e}
\end{equation}
```

```
\begin{equation}
\dot{q} \cdot a^2 \cdot L = h \cdot 4 \cdot a \cdot L \cdot \left( t_s - t_e \right)
\label{p1q1e}
\end{equation}
```

```
\begin{equation}
t_s = \frac{\dot{q} \cdot a}{4 \cdot h} + t_e
\label{p1q1e}
t_s \cdot ^\circ\text{C}
\end{equation}
```