The APP as a Tool,
A First Principles Approach

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Introduction: The APP as a Tool: A First Principles Approach
COMSOL Multiphysics® 1D Heat Transfer Model
COMSOL Multiphysics® 1D Heat Transfer Model

This APP models the calculation of heat loss (gain) under stationary (steady-state) conditions, for a wide range of applied conditions.
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\[ C_P \frac{\partial T}{\partial t} + \nabla \cdot q = 0 \]

where \( q = k \nabla T \)
COMSOL Multiphysics® 1D Heat Transfer Model

\[ C_P \frac{\partial T}{\partial t} + \nabla \cdot q = 0 \]

where \( q = -k \nabla T \)

\( \rho \) is the density of the material (kg/m\(^3\))  
\( C_P \) is the heat capacity at constant pressure (J/kg*K)  
\( T \) is the absolute temperature (K)  
\( k \) is the thermal conductivity (W/m*K)  
\( q \) is the conductive heat flux (W/m\(^2\))
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1D Geometry
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Heat Transfer Parameters

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Results Plots
Building The APP
APP Builder: The APP as a Tool: A First Principles Approach

Forms Development

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Results
Control

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APP Front Panel

The APP as a Tool: A First Principles Approach
Results
Results: The APP as a Tool: A First Principles Approach
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APP
Front Panel
K_m

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References:

1. R.E.White, Personal Communication, 2017
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References:

1. R.E.White, Personal Communication, 2017

References:

1. R.E. White, Personal Communication, 2017


3. R.W. Pryor, Multiphysics Modeling Using COMSOL 5 and MATLAB, p. 37
Results: The APP as a Tool: A First Principles Approach

The END

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Thank You!