



Documentation

Matlab Codes

HEX_profile.mat

1. Function name:

HEX_profile.mat

2. Model description:

HEX_profile is a single matlab code aiming to calculate the temperature profiles occurring between two media if the heat power is provided as an input. This code has been developed to be as general as possible and can be used for multi-phase heat transfer for both hot and cold fluid. It can also be used for compressible and incompressible fluids. This code basically implements in an automatic algorithm the cells division process as proposed by Bell et al. in "A generalized moving-boundary algorithm to predict the heat transfer rate of counterflow heat exchangers for any phase configuration," Appl. Therm. Eng., vol. 79, pp. 192–201, 2015.

3. Model inputs:

The model inputs are the following ones:

- fluid_h: name of the hot fluid
- P_h_su (Pa), inlet pressure of the hot fluid
- in_h_su (K or J/kg), inlet temperature or enthalpy of the hot fluid
- m_dot_h (kg/s), mass flow rate of the hot fluid
- fluid_c, name of the cold fluid
- P_c_su (Pa), inlet pressure of the cold fluid
- in_c_su (K or J/kg), inlet temperature or enthalpy of the cold fluid
- m_dot_c (kg/s), mass flow rate of the cold fluid
- Q_dot (W), heat power transferred between the hot and cold fluids;
- param: structure variable containing the model parameters, i.e.
 - param.type_h = type of input for hot fluid, ('H' for enthalpy, 'T' for temperature);
 - param.type_c = type of input for cold fluid, ('H' for enthalpy, 'T' for temperature);

It is really important to note that the model can handle both types of inlet conditions: either a supply enthalpy or a supply temperature. By default, it is assumed that the fluid is incompressible if the temperature is provided as input (liquid phase only).

4. Model outputs:

The outputs are summarized in a single structure variable named *out* which contains the following information:

- **out** (structure variable with all the relevant model outputs)
 - *x_vec* (-) : vector of power fraction in each zone
 - *Qdot_vec* (W) : vector of heat power in each zone
 - *H_h_vec* (J/kg): HF enthalpy vector
 - *H_c_vec* (J/kg): CF enthalpy vector
 - *T_h_vec* (K): HF temperature vector
 - *T_c_vec* (K): CF temperature vector
 - *DT_vec* (K): Temperature difference vector
 - *pinch* (K): pinch point value

5. External function requirements:

The user must install CoolProp (<http://www.coolprop.org/>) to run HEX_profile.mat.

6. Matlab version:

This code has been developed under Matlab R2015a

7. Contact:

For any further information, please contact one of the main developers of ORCmKit:

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