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function model_c1

%Nye county ventilation study: test case 1

% Definition of lines and nodes
% line 1: mixed air - 1 nodes;
% line 2 liner inside surface - 1 nodes;
global LS
LS=[2 1]; %2 lines with 1 segments

%This file will be called from model_in which prepares multiflux data files
%input data preparation
wd='.';     %current working directory
As=1.0;   %surface area
pbconst=88720; %user-defined barometric pressure
lew=0.000634;          %Lewis number
kcon=2.0;              %conductivity of wall rock
ct=1e-5;             %drift liner thickness
rgvf=20;                       %RGV wall rock resistance multiplier
kvap=1e-10;            %vapor permeability for generator resistance
hi=2.0;                        %inner surface heat transport coefficient
ho=2.0;                        %outter surface heat transport coefficient
%Drift section lengths:
dsl=ones(1,LS(2));

LN=size(dsl,2);  %conversion
kconc=kcon; %conversion
e1=0.8;   %example
e2=0.95;  %example
sbc=5.669e-8;  %Stephan-Boltzman constant

% cfd_in=[ LN sbc e1 e2 d1 d2 ct kconc keff ainv kod rgvf ];
cfd_in=[ LN sbc 0 0 0 0 ct kconc 0 0 0 rgvf ];   %check if it can be removed
TN=20;

%define connection to NTCF module
%ittg: index vector to relate segments (1,2,..) in NTCF to vector elements in ttg(i)
first=(LS(1)-1)*LS(2)+1;      %first element in 3rd line
ittg=first:LS(1)*LS(2);       %elements along 3rd line
ippg=first:LS(1)*LS(2);       %elements along 3rd line
iliner=ittg;                                        %node indeces on drift surface
iair=(1:LS(2))';                      %node indeces inside airway
qmav=[iair iair*0+As iair*0+1]; %air mass flow distribution control table
% igap=gind(:,2:size(gind,2));
% qmav=[qmav; igap(:) igap(:)*0+a6 igap(:)*0+1];

%define connection to previous and next sections
%iain: index vector to define intake air elements in ttg(i)
iain=1;                               %first elemet of second line
%iaout: index vector to define outflow air elements to connect to next section iain
iaout=LS(2);                                 %last elemet of second line

iwin=[1
   LS(2)+1];   %surface input prehistory index
iwout=[LS(2)   %surface output prehistory index
   LS(1)*LS(2)];

%define sources
%iheat: index vector to relate elements of qheat (1,2,...) to CFD nodes
iheat=[];  %14 WP segments, see 'cind'

%ivapor: index vector to relate elements of moisture network source nodes
ivapor=first:LS(1)*LS(2);     %elements along 3rd line

afm=[];  % afm table: air flow model
afmg=[];  % afmg table: air flow model

% Definition of connections between nodes of lines - heat
frc=[]; % frc table: free convection
foc=[];        % foc table: forced convection
coc=[];        % coc table: controlled convection, capacitive
cod=[]; % cod table: conduction
rad=[];        % rad table: radiation
duc=[];        % direct user connection -- not needed for this case; used to be hcc
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vcc=[];        % differentiial CFD -- not needed for this case
% Definition of generators
frcg=[];       % frcg table: free convection
focg=[];       % focg table: forced convection
cocg=[];       % cocg table: controlled convection, capacitive
codg=[];       % codg table: conduction
radg=[];       % radg table: radiation
ducg=[];       % direct user connection -- not needed for this case; used to be hcc
vccg=[];       % differentiial CFD -- not needed for this case

% Definition of connections between nodes of lines - moisture
frcm=[];       % frcm table: free convection
focm=[];       % focm table: forced convection
cocm=[];       % cocm table: controlled convection, capacitive
codm=[];       % codm table: conduction
ducm=[];       % direct user connection -- not needed for this case; used to be hcc
vccm=[];       % differentiial CFD -- not needed for this case
% Definition of generators
frcmg=[]; % frcmg table: free convection
focmg=[]; % focmg table: forced convection
cocmg=[]; % cocmg table: controlled convection, capacitive
codmg=[]; % codmg table: conduction
ducmg=[]; % direct user connection -- not needed for this case; used to be hcc
vccmg=[]; % differentiial CFD -- not needed for this case

   %1-2 (between nodes on line 1 and line 2)
   % frc table:  convection with user-defined h
   for i=1:LS(2)
       i1=i;
       i2=i+LS(2);
       %definition: frc=[100 i1 i2 As ri r2 dh h]
       frc=[frc; 100 i1 i2 As 0 0 0 ho];
   end

%generators

%user-defined for intake air to avoid automatic calculation
m=0.1;  %intake air mass flow rate
acp=1.00e+03;   %intake air heat capacity
irc=m*acp;
frcg=[frcg; 100 1 1 As 0  0 0 irc];
frcmg=[frcmg; 100 1 1 As 0  0 0 irc];

%connection on drift wall along line 2
% conduction
%definition: cod=[100 i1 i2 As ri r2 L k m]
for i=1:LS(2)
    i1=i+LS(2);
    codg=[codg; 500 i1 i1 As 0 0 ct kcon 1 ];
    codmg=[codmg; 500 i1 i1 As 0 0 ct kvap rgvf ];
end

%save results
mwrite([wd '/cfd_d/afm.dat'], afm);
mwrite([wd '/cfd_d/afmg.dat'], afmg);
mwrite([wd '/cfd_d/dsl.dat'], dsl);
mwrite([wd '/cfd_d/frc.dat'], frc);
mwrite([wd '/cfd_d/foc.dat'], foc);
mwrite([wd '/cfd_d/coc.dat'], coc);
mwrite([wd '/cfd_d/cod.dat'], cod);
mwrite([wd '/cfd_d/rad.dat'], rad);
mwrite([wd '/cfd_d/duc.dat'], duc);
mwrite([wd '/cfd_d/vcc.dat'], vcc);
mwrite([wd '/cfd_d/frcg.dat'], frcg);
mwrite([wd '/cfd_d/focg.dat'], focg);
mwrite([wd '/cfd_d/cocg.dat'], cocg);
mwrite([wd '/cfd_d/codg.dat'], codg);
mwrite([wd '/cfd_d/radg.dat'], radg);
mwrite([wd '/cfd_d/ducg.dat'], ducg);
mwrite([wd '/cfd_d/vccg.dat'], vccg);
mwrite([wd '/cfd_d/frcm.dat'], frcm);
mwrite([wd '/cfd_d/focm.dat'], focm);
mwrite([wd '/cfd_d/cocm.dat'], cocm);
mwrite([wd '/cfd_d/codm.dat'], codm);
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mwrite([wd '/cfd_d/ducm.dat'], ducm);
mwrite([wd '/cfd_d/vccm.dat'], vccm);
mwrite([wd '/cfd_d/frcmg.dat'], frcmg);
mwrite([wd '/cfd_d/focmg.dat'], focmg);
mwrite([wd '/cfd_d/cocmg.dat'], cocmg);
mwrite([wd '/cfd_d/codmg.dat'], codmg);
mwrite([wd '/cfd_d/ducmg.dat'], ducmg);
mwrite([wd '/cfd_d/vccmg.dat'], vccmg);
mwrite([wd '/cfd_d/LS.dat'], LS);
mwrite([wd '/cfd_d/cfd_in.dat'], cfd_in);
mwrite([wd '/cfd_d/ittg.dat'], ittg);
mwrite([wd '/cfd_d/ippg.dat'], ippg);
mwrite([wd '/cfd_d/iain.dat'], iain);
mwrite([wd '/cfd_d/iaout.dat'], iaout);
mwrite([wd '/cfd_d/iheat.dat'], iheat);
mwrite([wd '/cfd_d/ivapor.dat'], ivapor);
mwrite([wd '/cfd_d/iliner.dat'], iliner);
mwrite([wd '/cfd_d/iair.dat'], iair);
mwrite([wd '/cfd_d/qmav.dat'], qmav);
mwrite([wd '/cfd_d/iwin.dat'], iwin);
mwrite([wd '/cfd_d/iwout.dat'], iwout);
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