From Linn Laage 1-28-99

Mining 486 Class:

There are several points to be made regarding the MFIRE exercises we recently worked.

1) This MFIRE allows spaces in the file names.
2) This MFIRE, when initiated with Windows explorer, assumes a txt extension is associated with the file so please include it in the file name. The FORTRAN executable (MFIRE)is expecting numbers only, not control characters associated with word processors.
3) I told you that MFIRE could detect new features about your mine and/or data set. Remember the convergence problems we had. Also remember the adiabatic compression ratio. $\Delta T = \frac{\Delta Z}{187}$ If we compute the proper temperatures at the surface nodes, we see that convergence happens. Attached to this EMAIL are waldo50.txt, waldo57.txt, waldo60.txt and waldo65.txt corresponding to observer temperatures of 50. 57, 60 and 65 degrees F. These run and converge and show the reversal; but some instability is noted. If you run into this situation (instability) in real life, try fixing the airway quantities or breaking the airway up into 2 or 3 sections. Its too long to cover here but what's happening is that the starting and ending nodes are being swapped to determine the air flow direction and they get "stuck".

The paragraph below is notes I added to the waldo50.txt file. The other files are similarly altered for the appropriate temperatures.

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*****************START OF PARAGRAPH**************************
$ DR CHANGED TO 0.060 APPROXIMATLY THE STANDARD DENSITY AT 7200
"
$ FEET ELEVATION.  If the observer is at the end of airway #46
$ OR JUNCTION #4 AT A ATEMPERATURE OF 50 DEG f ,
$ and adiabatic compression only causes the temperature to vary
$ at the 6 surface junctions then junction 1 - 47.8;
$ junction 3 - 49.2; junction 4 - 50; junction 27 - 48.3;
$ junction 33 - 47.8; junction 34 - 48.3 degrees F.
$ the fan is removed at NFUM IN CONTROL LINE AND AT NWTYP IN
$ AIRWAY LINES; ALSO THE R IS CHANGED FROM 5.0 TO 0 TO ALLOW
$ MFIRE TO CALCULATE THE RESISTANCE AS A NORMAL AIRWAY.
$ R IN AIRWAY # 46 IS CHANGED TO 0 TO ALLOW MFIRE TO CALCULATE
$ THE RESISTANCE (IT WAS SET HIGH TO 500 FOR SOME REASON)
$ ALSO CONTROL LINE #2 SPECIFIES THE STARTING JUNCTION (3) AND
$ THE TEMP WHICH IS CHANGED TO 56.2
****************END OF PARAGRAPH**************************
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Stairwell Problem or Hartman 8.5

Using the formulas on the hand outs and the textbook (pg720 for Pvsat) calculate the air density at each floor for each measurement; please show your work. If you use a spreadsheet, please include formulas you used.

An altimeter survey of the Mining Building stairwells was conducted by the class with the following results:

1:00 PM 7 Th. Floor.
Elevation is 704.6 ft.
Dry bulb temp was 71.5 deg. F
Wet bulb temperature was 53.0 deg. F
Altimeter read 706.6 feet

1:15 PM 4 Th. Floor.
Elevation is 662.6 ft.
Dry bulb temp was 72 deg. F
Wet bulb temperature was 57.0 deg. F
Altimeter read 664.7 feet

1:30 PM 1 st. Floor.
Elevation is 620.6 ft.
Dry bulb temp was 74.0 deg. F
Wet bulb temperature was 59.0 deg. F
Altimeter read 622.6 feet

1:45 PM 4 Th. Floor.
Elevation is 662.6 ft.
Dry bulb temp was 73.0 deg. F
Wet bulb temperature was 58.0 deg. F
Altimeter read 664.8 feet

2:00 PM 7 Th. Floor.
Elevation is 704.6.6 ft.
Dry bulb temp was 71.5 deg. F
Wet bulb temperature was 69.0 deg. F
Altimeter read 706.9 feet
End of problem