EFD lab 3

Students need to use the correct data when obtaining the pressure coefficients graph for both angles. The correct column that contains the static pressure heads for each tap on the airfoil surface is marked with a red arrow on the figure below:

'Legend:

'File Name

'Angle (degrees), Temperature (degC), Manometer Fluid Density (Kg/m3)

'A/D channel, Sampling Rate (Hz), Settling Time (s), Number of Points, Number of scans

'====================

C:\Users\fluidslab\Desktop\Lab_3_Fall_2013\Group_1&2\pressure0AoA.txt

0	21.7	784.8		
Dev1/ao0	1000	1	2000	5

'====================

'Data Section - Pressure Tap Number (Scanivalve Port), Temperature (degC), Mean Pressure (Pa)

'====================

0	21.7	122.4489	150.0513
0	21.7	120.8537	148.9376
0	21.7	118.7761	145.991
0	21.7	123.5774	149.5914
0	21.7	121.3284	148.1001
0	21.7	121.0008	148.8271
0	21.75	121.9516	149.1632
0	21.8	120.5192	148.9054
0	21.8	122.344	148.2406
0	21.8	121.2514	147.2326
1	21.8	104.9361	148.8492
2	21.8	49.6799	148.8113
3	21.8	-8.00736	148.83
4	21.8	-36.705	147.6175
5	21.85	-50.9227	149.3309
6	21.85	-65.53	147.5243
7	21.9	-72.3764	147.1105
8	21.9	-72.5734	148.5242
9	21.9	-69.266	150.4275
10	21.9	-64.8186	147.4987
11	21.9	-54.3549	149.3759
12	21.9	-46.6189	149.5442
13	21.95	-34.6009	146.9177
14	21.95	-5.94477	147.1808
15	21.95	7.6163	148.8704
16	21.95	-1.40112	149.4269
17	21.9	-5.47465	147.297
18	21.9	-9.26537	149.8179
19	21.9	-12.2003	148.2066
20	21.95	-16.086	147.8406
21	22	-23.362	148.1518
22	22	-31.6873	146.5781
23	22	-37.8011	147.6083
24	22	-90.6658	146.0691
25	22	-102.003	147.115
26	22	-121.967	147.8711

Also for the wake velocity profile, students need to rearrange the measured velocity at elevation y to match the data reduction sheet.

wake_0_AOA - Notepad

File   Edit   Format   View   Help

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10/29/2013        10:23 AM
Angle of attack:        0.00
Time     Temp. (degC)  Position (mm)   Pitot Mean Velocity (m/s)      Pitot Std. Dev (m/s)     Hot Wire
10:24:43     22.100000      200      15.040590      0.113759      15.132206      0.140121
10:25:14     22.100000      150      15.188389      0.081168      15.281145      0.195092
10:25:46     22.100000      100      14.970740      0.123326      15.332386      0.128101
10:26:11     22.100000       90      14.995082      0.075469      15.132380      0.145200
10:26:36     22.100000       80      14.911208      0.131494      15.026613      0.105086
10:27:02     22.200000       70      14.884442      0.118828      14.833523      0.111399
10:27:27     22.200000       60      14.882079      0.062558      14.908636      0.148047
10:27:52     22.200000       50      14.699880      0.161191      14.614878      0.103755
10:28:17     22.200000       40      14.704224      0.088503      14.659669      0.135234
10:28:43     22.200000       30      14.723636      0.111551      14.398545      0.117971
10:29:08     22.200000       20      14.652555      0.119219      14.465995      0.131058
10:29:33     22.200000       10      14.701354      0.072922      13.958931      0.217820
10:29:57     22.200000        6      14.647400      0.076714      13.485357      0.671496
10:30:22     22.200000        4      14.478899      0.100064      12.762024      1.190756
10:30:45     22.200000        2      13.671752      0.118052      11.223936      1.352205
10:31:09     22.200000        0      12.496585      0.098134       9.681107      1.495599
10:31:33     22.200000       -2      10.594280      0.077615       7.074640      1.031848
10:31:57     22.200000       -4       9.901457      0.105540       8.380034      1.253884
10:32:21     22.200000       -6      11.516671      0.081697      10.319806      1.082790
10:32:45     22.200000      -10      13.493481      0.089957      12.637232      0.810029
10:33:10     22.200000      -15      14.520814      0.063551      13.844035      0.219640
10:33:35     22.200000      -20      14.624323      0.100744      14.087231      0.114135
10:34:00     22.200000      -30      14.559429      0.104654      14.289900      0.177729
10:34:25     22.200000      -40      14.608157      0.092038      14.343609      0.172556
10:34:50     22.200000      -50      14.625912      0.112043      14.593459      0.096042
10:35:15     22.200000      -60      14.615599      0.141178      14.488712      0.105749
10:35:41     22.200000      -70      14.688138      0.074578      14.452851      0.155091
10:36:06     22.300000      -80      14.645780      0.125454      14.716790      0.153206
10:36:31     22.300000      -90      14.513256      0.141161      14.602861      0.113238
10:36:56     22.300000     -100      14.652361      0.112280      14.835201      0.144214
10:37:28     22.300000     -150      14.773717      0.058989      14.906860      0.111879
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y (m)	Pitot_probe u (m/s)	y/c	Pitot u/U∞	F	Dᵢ	Hot_wire u(m/s)	Hot-wire u/U∞	F	Dᵢ
-0.15		-0.492125984	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
-0.1		-0.32808399	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
-0.09		-0.295275591	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
-0.08		-0.262467192	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
-0.07		-0.229658793	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
-0.06		-0.196850394	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
-0.05		-0.164041995	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
-0.04		-0.131233596	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
-0.03		-0.098425197	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
-0.02		-0.065616798	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
-0.015		-0.049212598	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
-0.01		-0.032808399	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
-0.006		-0.019685039	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
-0.004		-0.01312336	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
-0.002		-0.00656168	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
0		0	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
0.002		0.00656168	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
0.004		0.01312336	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
0.006		0.019685039	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	Hot_wire
0.01		0.032808399	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
0.02		0.065616798	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
0.03		0.098425197	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
0.04		0.131233596	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
0.05		0.164041995	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
0.06		0.196850394	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
0.07		0.229658793	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
0.08		0.262467192	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
0.09		0.295275591	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
0.1		0.32808399	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
0.15		0.492125984	#DIV/0!	#DIV/0!	#DIV/0!		#DIV/0!	#DIV/0!	#DIV/0!
0.2		0.656167979	#DIV/0!	#DIV/0!			#DIV/0!	#DIV/0!	
				D (Pa*m)	#DIV/0!			D (Pa*m)	#DIV/0!
				C_D =	#DIV/0!			C_D =	#DIV/0!